

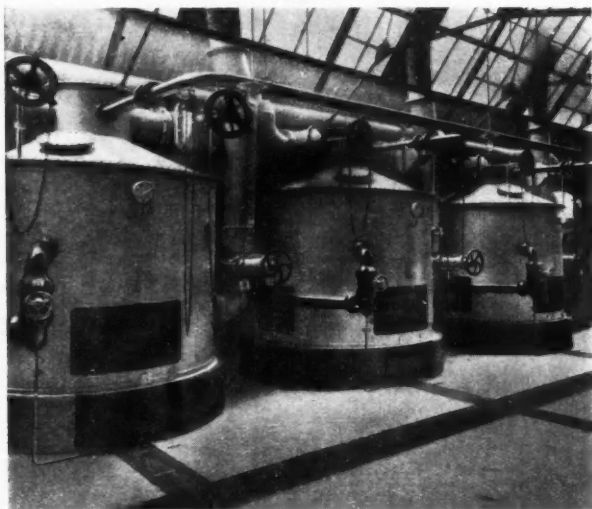
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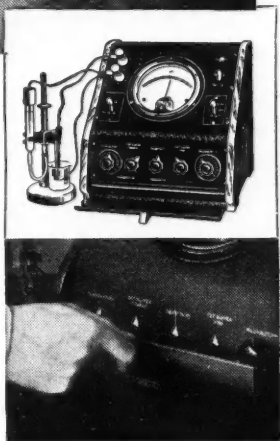
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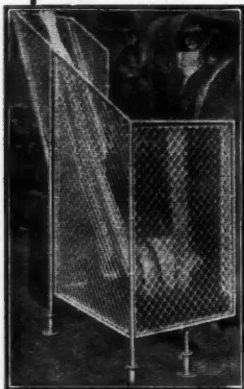
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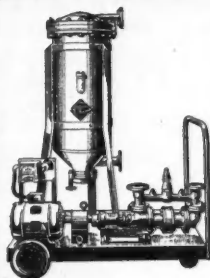
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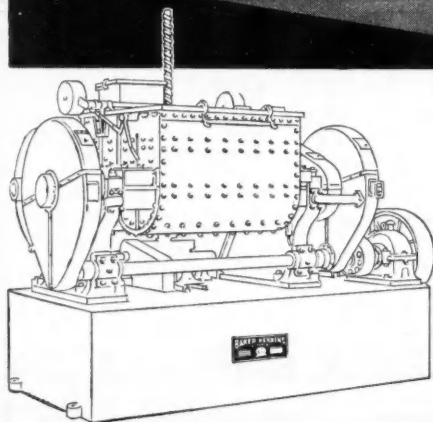
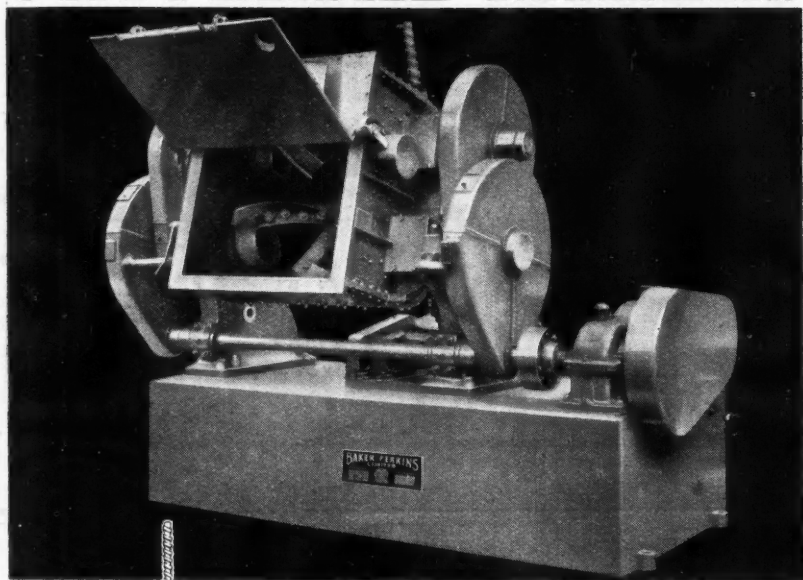
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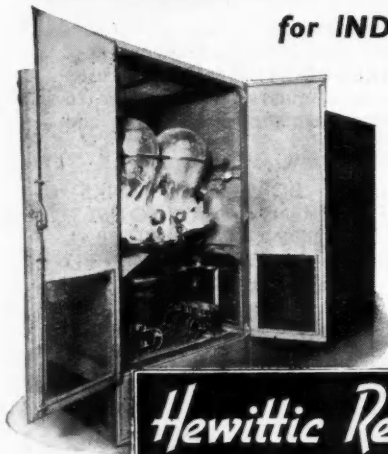
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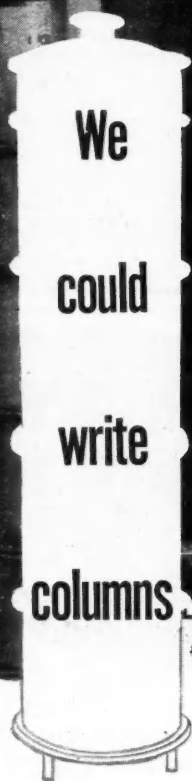
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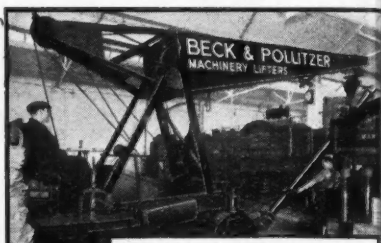
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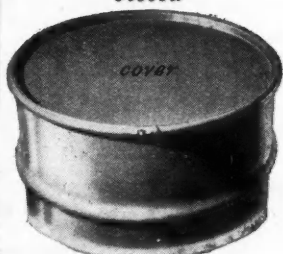
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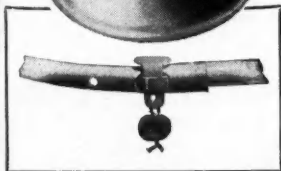
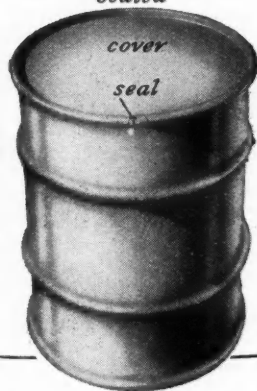
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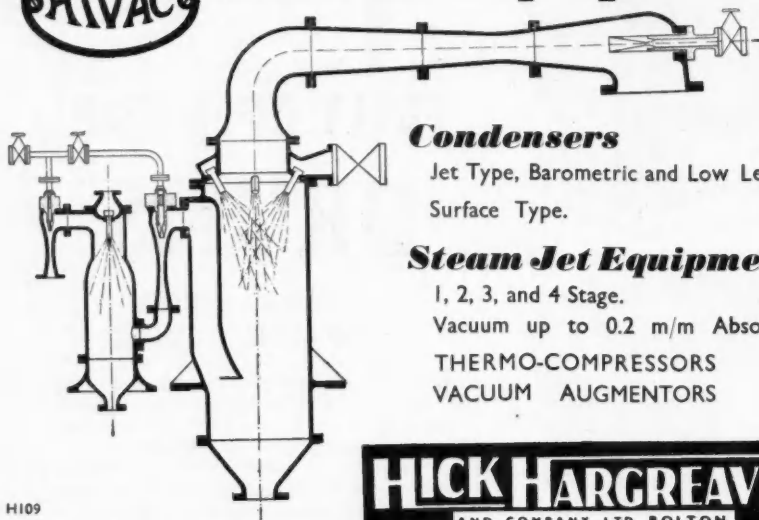
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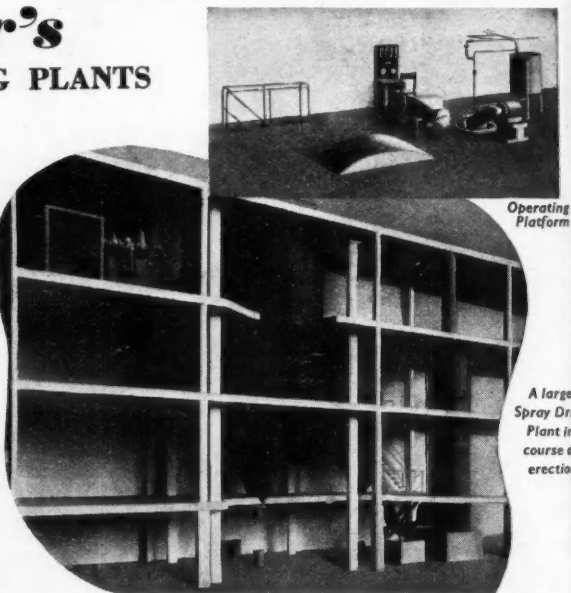
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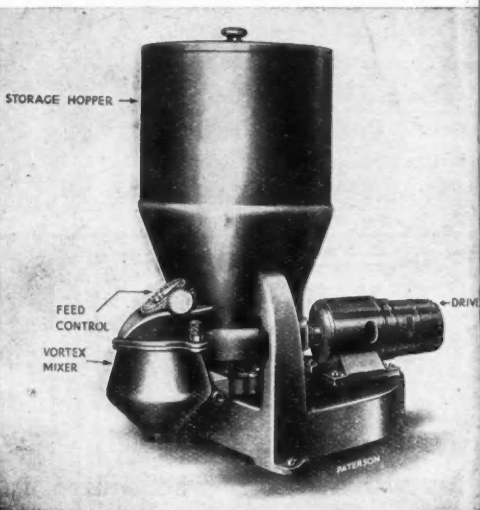
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The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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Development of Inventions

AMONG a body of controversial legislation introduced in this present Parliament that of the Development of Inventions Bill has commanded more detailed attention from those concerned than much other proposed legislation. It bristles with potentialities for good—and evil. In this measure, it will be recalled, the Government proposes to establish a national body for the development and exploitation of inventions—a National Research Development Corporation to which the Board of Trade may make advances for working capital of up to £5 million within five years of its establishment.

One of the prime needs of this country is the encouragement of the inventive spirit. The British have always been pioneers in discovery; but they have frequently failed to apply their discoveries in such a way as to secure the reward of inventiveness. Too often British inventions or discoveries have been exploited abroad, so that the foreigner ultimately sold us the plant necessary to operate the process we had discovered. The fruits of the "Bakelite" process were not retained for this country because the inventor had been driven to America to seek the support which was denied him here. If means can be provided to give inventors the scope to test their inventions by economic standards something of the greatest imaginable value will have been created.

On those grounds the Bill has much to recommend it. There is, of course, at least one other aspect of what is proposed:

that of an inventor whose design or process is bought and pigeon-holed for business reasons. The Swan Patents committee, which we believe voiced the proposal that gave rise to this Bill, may have been animated by the idea that it is always wrong to sterilise an invention. It is the obvious judgment, but not necessarily the final one. Everything depends upon whether an invention is a considerable advance, a slight advance, or merely another and equally good way of doing a thing. A firm that has just invested a great deal of capital in a new plant cannot afford to scrap that plant and pour its money down the drain to make a small advance in technology. If, on the other hand, some other undertaking does, the result might be exactly the same. That, broadly, is the case for firms which purchase an invention and seek to improve upon it until the money invested has been recovered. The new process, perhaps considerably improved, may then be applied with greater success. Sterilisation or suspension of inventions may be theoretically reprehensible, but the reverse can be more disastrous to the national economy.

What this country most evidently needs is the energetic development of substantial new procedures and other results of scientific research, so that whatever is good to exploit commercially shall be exploited by British industry. The new corporation is charged first with the function of developing or exploiting "inventions which result from research by Government and other organisations financed by Public Funds."

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Here the value of what is proposed is much less certain. If it is proposed, as seems possible, that the Government is to go into business, there will be little general enthusiasm for the Bill. The proper method is to offer inventions to private firms and to take them up officially only if that industry will have none of them; that seems to be the primary method upon which the corporation will work. But if industry refuses to take up a major invention, is not that evidence that the invention does not constitute a sufficiently marked advance?

The corporation is empowered, however, to carry on any activity which appears needful and advantageous, including the promotion or facilitation of such activities by third parties. It appears, therefore, that the corporation could finance the exploitation of an invention by a firm that was not prepared to take the risk itself.

Those who have had experience of trying to secure the commercial exploitation of an invention know how unfruitful that can be. Caution is often carried to extremes; frequently firms already have their hands full and their capital fully occupied. It is not unknown for inventors to be treated shabbily, and to lose their invention through lack of business acumen. A corporation that will give disinterested advice to inventors on the merits of their inventions would indeed be of great value and would save much wasted time. The

proposed body should at least ensure that no one need take his invention abroad if it is of value. But to procure that result the corporation would require to carry a staff of scientific and technical men of considerable industrial experience, without whom the whole purpose of the arrangement would be defeated.

A second and very much more difficult matter is to ensure that inventions are not sent abroad, or patented abroad, before their value is recognised in this country. There must be no curtailment of the freedom of scientific publication; that of course is essential. But once a fact is published it cannot be the subject of a patent. In introducing this Bill, the Government has expressed the hope that any discovery of significance will come to the attention of the corporation "before it is too late to secure its full benefits for this country." Just how that is to be achieved is not at all clear. We know, for example, that the ultra-violet irradiation of ergosterol to produce vitamin D was discovered here and patented in the U.S.A. Suppose that process or one of equal scope in another field were published in a British journal; could it be patented here? Would its value be immediately recognised by the corporation before recognition by someone abroad? In the field of early recognition of the value of new work there appears to be a wide margin for failure, no less than the necessity for the employment of a large staff of "supermen."

NOTES AND COMMENTS

Radioactive Isotopes

WITH a gradualness which seems attuned to the long-term standpoint of most official pronouncements on industrial prospects of atomic energy comes news of British progress in the peaceful development of nuclear fission. Containing more promise of actual benefits in store was the announcement this week that the second atomic pile at Harwell should be in operation this summer and should be capable of freeing all research workers in this country of dependence on the U.S.A. for the radioactive isotopes needed in a constantly widening field of investigations. These isotopes, moreover, will be endowed with a considerably greater activity than those emanating from the present low energy pile in operation—the "Gleep"—at a maximum rate of some 120 samples a month. Of these, about one-third are retained for research at Harwell and most of the remainder, especially radio-sodium, are rightly reserved for hospitals' use. Chemists have in general had little encouragement to take more than an academic interest in the use of these unique tracer materials, regardless of revolutionary effect which they may have on analytical methods. The anomaly is better recognised and consequently much less glaring in the U.S.A. There, many branches of industrial research have for some time been reaping the benefits of the potent new procedures, which can scarcely fail to confer on them an enviable advantage.

Chemists' Responsibility

WHILE a parallel cannot fairly be drawn between us and the nation which has been the repository for a term of years of all atomic information of importance, there is everything to be said for adopting the view now being accepted in America of the chemists' part in forwarding the new science. Dr. Paul Aebersold, head of the Isotopes Division of the AEC station at Oak Ridge, Tennessee, has told members of the American Chemical Society and the American Institute of Chemical Engineers that the chemist holds the key to the successful exploitation of radioactive isotopes. When removed from

the uranium pile the isotope is in a crude chemical form, unsuited for use in medical therapy, agricultural research, or other similar investigations, he explained. If it is to be used for medical study, for example, it must be incorporated synthetically into some body chemical, such as a hormone or vitamin, or if it is to shed new light on a plant's utilisation of food, the isotope must be made into fertiliser. While the chemist is able to expedite progress in other fields of science by transforming crude radioactive isotopes into complex chemical compounds, studies with isotopes are helping to solve many problems concerning atoms and molecules which have heretofore baffled the chemist, Dr. Aebersold pointed out. They were permitting more and more scientists to observe the behaviour of specific atoms and molecules in a wide variety of biological, chemical, or physical systems, ranging from test tube to factory vat and from the microbe to man.

Chemicals at the B.I.F.

A CHEMIST of distinction in pre-Hitler Austria gives us these impressions formed in his visits to the chemical and other sections of the B.I.F.: I was continually reminded (he writes) of the title of your journal. Olympia and Earls Court seemed indeed to reflect the emergence of a chemical age—of applied chemistry in agriculture, household needs, textiles, medicine and fields almost unnumbered which are not generally thought of as within the realm of chemistry itself. The 1948 B.I.F. has shown in particular how chemical discoveries which emerged in war have been applied to peacetime production, and in general how new achievements are altering the material framework of our civilisation. For a chemist it has been a memorable occasion to see all this revealed in one exhibition, in fact the whole story with the significant exception of the products of atomic energy. Remembering also what last year's centenary celebrations of the Chemical Society revealed, there remains in my mind no doubt that British chemistry, pure and applied, is in a good way to produce the means, both of

intellect and material, to supply all the chemical products needed for industrial wellbeing and a virile export trade.

Source of Efficiency

SUCH praise of what the present B.I.F. has revealed prompts speculation on the possible effect on future fairs if the ideal of nationalisation of all the basic industries were to be realised. Practically every exhibit this year was, as ever, the product of private enterprise. Sir Francis Joseph, speaking as a guest of the Purchasing Officers' Association at a lunch associated with the exhibition at Castle Bromwich, has underlined that little publicised fact, and has called attention to the necessity of preserving the competitive spirit, without which the impetus which has produced so many advances in technology would not have arisen. This is one of the factors on which the protagonists of State industries prefer not to dwell, despite the increasing difficulty of evading the issue. Their position is rendered all the more difficult by the recurrent shafts of realism afforded by, among others, Mr. Alfred Edwards, Labour M.P. for Middlesbrough East. Of the steel industry, which is his intimate concern, he says "To put the steel industry in the hands of the Civil Service is suicide, and it is treachery to the country. . . . There was never an industry in this country run as efficiently as the steel industry is to-day." Two days later, the Iron and Steel Federation provided evidence of the truth of his claims, recording that steel produced in April had set

yet another record, reaching an annual rate of 15,283 million tons. This was the fourth record established in as many months.

Where There's Smoke . . .

A POINTED commentary on propaganda publications of the two principal political parties is provided by *Smokeless Air*, No. 66, the official journal of the National Smoke Abatement Society—whose aims are to eliminate, or at least reduce pollution of the air by industrial smoke and fumes which, judging by a recent report of H.M. Chief Inspector of Factories, all too frequently belch from stacks of chemical factories. The journal draws attention to the unfortunate impression created recently by a photograph of heavy industrial smoke, and the accompanying text which began: "Smoking chimneys, spell prosperity . . ." Nor is Government propaganda less thoughtless, and curiously enough it draws upon the same theme to urge "more production." The spectacle of "a great red chimney pouring forth foul, black smoke" is not, we agree, the happiest or the most typical symbol of industrial activity, and one must sympathise with the society in its plea that politicians should exercise a little more discretion in preparing propaganda. The good work this society does deserves support from all quarters and receives it from all responsible sections of chemical industry. It is unfortunate that Government propaganda departments should be less enlightened.

TASMANIAN SOURCE OF SULPHATE OF AMMONIA

THE Electrolytic Zinc Co. of Australasia, Ltd., is to spend £2.25 million on a new plant to manufacture sulphate of ammonia. The factory will be an adjunct to the company's ore-processing works at Risdon, Tasmania, and when in full operation will have an output of 50,000 tons a year. Final negotiations are now in progress for the purchase of electric power on satisfactory terms and for permission to import some of the necessary machinery. Five plants are required to produce hydrogen, nitrogen, ammonia, sulphuric acid and sulphate.

Apart from industrial uses, a great deal of sulphate of ammonia is used in Australian primary industries for fertilisers. Present supplies are insufficient. About half of

what is needed now comes as a by-product from gas works and coke ovens. To relieve the shortage, four small plants owned by the Federal Government are being converted to produce sulphate of ammonia, and one is already working. In these the cost of production would be relatively high because of the cost of raw materials, coke and brimstone.

At the proposed Tasmanian plant, sulphur would be obtained from the zinc concentrates, and the use of hydro-electric power would supply the other constituents. Costs of production by this method would be lower and would be further reduced by the volume of production.

CONTINUED EXPANSION OF I.C.I.

Still More Capital May be Sought

THE vast capital requirements to maintain chemical production on the largest scale and to finance the kind of development policy being carried out by Imperial Chemical Industries, Ltd., is revealed in the company's report and accounts for 1947 and by the statement by the chairman, Lord McGowan. Referring to the total of some £15.5 million associated in the balance sheet with future capital expenditure, the chairman observed that the capital expenditure programme in fact would involve a much larger figure. "The means of financing the further large expansion is receiving the consideration of the board," he said.

During the year, I.C.I., whose present issued capital is £74,542,807, spent £12,335,000 on new construction and the acquisition of war-time factories from the Government.

Output Records Established

Reviewing the work of the company in 1947, Lord McGowan pointed out that the demand for many products exceeded the ability to supply, in spite of efforts to increase output. In certain cases they had been compelled to introduce rationing schemes for home trade customers.

With the exception of alkali, the production of which was seriously hampered by coal shortage in the first nine months of the year, output of the company's major products was higher than in 1946 and, in the case of blasting explosives, non-ferrous metals, industrial nitrocellulose and certain fertilisers, the production figures have established a record.

The report mentions the good progress made in the development and marketing of a new type of leathercloth, "Vynide," which is particularly suitable for the transport industry, and describes the sales of the "Gammexane" insecticides as "most encouraging." Sales of plastic materials increased substantially in 1947 despite the shortage of raw materials and, although the production of polythene was 28 per cent higher than in the previous year, the demand greatly exceeded supply.

Lord McGowan reported that 12 months ago the company arranged to convert a considerable proportion of coal-burning equipment to the oil-firing type. This had proved a satisfactory step and for many of the smaller installations the change had resulted in improved output and efficiency.

The total sales value of I.C.I.'s direct exports in 1947 amounted to £32,600,000, an increase of £300,000 on the previous

year and nearly £21,000,000 more than in 1938. In volume, direct exports last year showed an increase of 26 per cent over the 1938 figure.

The chairman reported that to relieve the burden on Sir Frederick Bain, and Sir William Coates as deputy chairman, Mr. H. O. Smith and Mr. J. L. S. Steel, in addition to their respective responsibilities for the Explosives Group and the Paints and Plastics Group, had taken over the duties of personnel director from Sir Frederick Bain, and Mr. Chambers had taken over the duties of finance director from Sir William Coates. Mr. Killiery had been appointed to take charge of the Heavy Chemicals Group.

The following statistical résumé of the company's consolidated activities for 1947, with comparable figures for the previous year, gives some indication of the increase in productive activity.

	I.C.I. and 84 Subsidiaries 1947 £m	I.C.I. and 62 Subsidiaries 1946 £m
Gross manufacturing and trading proceeds and gross income from investments, etc. ...	140.4	119.8
Raw materials and purchases for resale, maintenance of plants, freight charges, factory and sales administration expenses (exclusive of salaries and wages) ...	81.8	67.4
Wages and salaries ...	34.2	30.5
Pensions and contributions to Pension Funds ...	2.9	1.8
Obsolescence and depreciation of plants ...	4.3	4.2
United Kingdom and Overseas taxation ...	8.9	8.4
Retained by the company for additions to reserves including special addition to Central Obsolescence and Depreciation Provision ...	4.4	3.6
Distributed as net dividends to stockholders ...	3.0	3.0
	140.4	119.8

New Microfilm Reader.—A microfilm reader by a British firm of optical and scientific instrument makers will be shown to the public for the first time at the Engineering and Industrial Equipment (Home and Export) Exhibition, May 19-28, at the Royal Horticultural Hall, Vincent Square, Westminster, London, S.W.1. The reader has been produced to meet the requirements of the International Federation of Documentation and as such will help to speed up international exchange of information.

Monopoly Bill Criticised

NUM Alleges Political Bias

IN a well balanced survey of the aims and provisions of the Monopoly (Inquiry and Control) Bill, *The Journal of the National Union of Manufacturers*, May, lends further emphasis to the fact that the scope of the Bill is limited to restrictive practices only insofar as they can be attributed to employers.

Trade Unions Excluded

Trade Union practices of a similar nature, *The Journal* notes, are specifically excluded. It continues: "What justification can there be for dealing with the subject in this piecemeal fashion? Surely it is the act which counts and not who happens to commit it?"

"It is well known that the restrictive practices of the Trade Unions, designed for the most part in the fear of unemployment, constitute one of the gravest handicaps upon the achievement of that increased production of which we stand in such dire need."

The Government had carefully refrained from taking any action in this field and confined the operation of its Bill to the employers, although except in industries which had been nationalised or which had special powers conferred on them by the Government, anything like complete monopoly was almost unknown in this country. "What happens," asks *The Journal*, "if restrictive practices are alleged against one or more of the Government monopolies themselves?"

Another aspect of the Bill—the Monopoly Commission to be set up under Clause 1—receives careful attention. The appointment of members, for example, was a matter that needed discrimination. Their duties and responsibilities were vitally important, and only the "very best people" should be selected for the work.

Political Clause

Some criticism is made of Clause 10, which gives certain Ministries the power to make orders, subject to affirmative resolutions in both Houses of Parliament. "The effect of this Clause," *The Journal* observes, "is to introduce politics into the operations of the Bill."

The Clause was apparently designed to meet a situation such as would arise if the Commission discovered the existence of a monopoly, with which for reasons of a party political nature the labour party wished not to interfere. The making of an order under Clause 10, therefore, would depend solely upon the whims of the prevailing Parliamentary majority.

"The Decline of Britain"

Du Pont President's Verdict

THE cause of the British crisis was attributed by Mr. Crawford H. Greenewalt, president of E.I. Du Pont de Nemours, speaking at the annual dinner of the U.S. Chamber of Commerce last week, to "a failure to recognise the vitalising effect of free competition and the importance of that competition in ensuring a dynamic economy."

The economies of both England and Europe, he said, had been progressively weakened by a willingness to forego competition in order to preserve the *status quo*.

Results of Controlled Economy

Mr. Greenewalt cited what he termed "the decline of Britain" as an example of the consequences of curtailing personal economic incentive and said that wherever controlled economy had been tried the inevitable results had been despair, chaos and collapse.

He described free individual initiative as America's greatest national resource, and said that, from his standpoint as a chemical engineer, science had taught him a common guiding principle which could be applied to government and economics—never to discard the results of a well demonstrated experiment in favour of a hypothesis that denied those results. Socialism, fascism, and communism differed only in degree of application and the final results did not differ at all. They were rungs in a ladder from freedom to slavery.

FUNDAMENTAL RESEARCH

"WE still hold the opinion that research, both fundamental and applied, will prove to be in the future the key to the continuing success of your undertaking," said Mr. Oliver Lyttelton, chairman of Associated Electrical Industries, Ltd., at its 48th annual general meeting.

He claimed that AEI was one of the few companies in the world that had a fundamental research department which was entirely divorced from application research. The AEI research department at Aldermaston, Berkshire, already occupied about 150. It was in the charge of Dr. T. E. Allibone, and although not long established was already making great progress.

Of the applied research establishments at Trafford Park, Manchester, and Rugby, the chairman said that work undertaken included: A magnet and auxiliary gear for the cyclotron at Liverpool University; a 20-million electron-volt betatron, being supplied to the Christie Hospital for cancer research; and a 300-million electron-volt synchrotron developed for Glasgow University.

Chemical Statistics

Increased Production and Use

SUBSTANTIAL increases in production and consumption of many basic chemicals and of some non-ferrous metals are recorded to have taken place in February and March. According to the summaries published in the *Digest of Statistics* for the month, March saw an increase in sulphuric acid production, by comparison with the same month a year ago, of approximately 33,000 tons (from 101.9 to 135.0 thousand tons). Consumption of acid, as of many other of the basic chemicals, rose on an even larger scale (from 85 to 124 thousand tons) and stocks at the end of the month were appreciably depleted at 60.2. An interesting exception to the general depletion of stocks was industrial alcohol, of which 8.23 thousand tons were recorded to be in store in February, in spite of a consumption increase of from 1.50 to 2.67 thousand gallons. One of the largest increases was that recorded in the fertiliser field, where production of compound fertilisers rose from 88.8 to 158.3 thousand tons in February and use was almost doubled at 210.1 thousand tons.

A marked feature of the returns was the considerably increased consumption of non-ferrous metals compared with the same period a year ago. Virgin copper, of which in February last year only 13,000 tons were consumed, led the field with a figure of 29,300 tons, while refined lead jumped from 9600 to 18,300 tons.

Rising Steel Output

Production Record Again Beaten

STEEL production in April, states the Monthly return of the Iron and Steel Federation, reached the record annual rate of 15.283 million tons, thus exceeding the March rate by 166,000 tons. The extent of the industry's achievement in April assumes an even greater significance when it is compared with the annual rate of 12.294 million tons recorded for April, 1947.

Production rates this year have consistently shown substantial increases, the return for each of the four months creating successive records. Commenting on the results, the federation had attributed them largely to the continued success of the home scrap drive which has now checked the fall in stocks of scrap and pig iron.

Pig iron production last month at the annual rate of 9.433 million tons compares with 9.303 million in March, and 7.238 million in April a year ago. Increased output in this field reflects the activity of newly established blast furnaces, two of which have recently set up European records.

Steelworkers Congratulated.—The employees of eight West Wales steelworks, who for the past 17 weeks have consistently beaten their target figure of 14,000 tons of steel ingots per week, have received a congratulatory wire from Mr Ernest Lever, chairman of the controlling company Richard Thomas and Baldwins.

PRODUCTION AND USE IN FEBRUARY-MARCH

	February, 1948 Thousand Tons			February, 1947 Thousand Tons		
	Production	Consumption	Stocks	Production	Consumption	Stocks
Sulphuric acid	135.0†	124.0	60.2†	101.9†	85.0	70.9†
Sulphur	—	22.9†	85.0†	—	16.6†	72.6†
Pyrites	—	20.8†	69.0†	—	14.8†	73.0†
Spirit oxide	—	16.7†	166.0†	—	14.3†	143.2†
Molasses	8.8	21.9*	217.2	25.5	15.2*	169.2
Industrial alcohol (mil. bulk gal.) ...	1.52	2.67	8.23	1.09	1.50	1.99
Superphosphate	95.8	142.0	104.4	66.6	85.8	172.9
Compound fertilisers	158.3	210.1	188.6	88.8	110.0	262.0
Agricultural lime	—	325.0	—	—	148.2	—
Ammonia†	—	6.37†	5.02	—	3.86†	4.14
Phosphate rock (agricult.)	—	74.6	116.5	—	53.0	108.6
Phosphate rock (indus.)	—	6.57	42.3	—	3.12	36.2
Virgin aluminium	2.29	14.0	—	2.56	6.9	—
Magnesium	0.16	0.24	—	0.14	0.17	—
Virgin copper	—	29.3	97.3	—	13.0	85.8
Virgin zinc	—	18.7	33.7	—	11.6	40.8
Refined lead	—	18.3	39.2	—	9.0	19.7
Tin	—	2.47	15.3	—	2.15	18.8
Zinc concentrates	—	13.5	63.0	—	13.7	92.0
Steel ingots and castings (including alloys)†	201†	—	—	196†	—	—
Rubber:						
Waste collected	0.01	0.49	15.0	0.08	1.38	96.5
Reclaimed	0.49	0.48	4.02	0.19	0.21	5.14
Natural	—	4.37	131.8	—	7.62	174.7
Synthetic	—	0.06	1.99	—	0.03	3.17

* Distilling only.

† March.

‡ Weekly average.

Sulphuric Acid and Oleum Returns

Production and Use in January and March

THE summary of the monthly returns of the National Sulphuric Acid Association for the quarter ended March 31, reveals that production of sulphuric acid and oleum in the United Kingdom and Eire during that period amounted to 403,995 tons. This is an increase of nearly 19,000 tons on the preceding quarter.

The total consumption for manufacturing and trade purposes amounted to 408,154 tons and the principal users of the acid were producers of rayon and transparent paper, sulphate of ammonia, and superphosphates.

The association provides the following details of production and use:—

SULPHURIC ACID AND OLEUM SUPPLIES

	Chamber only	Contact only	Chamber and Contact
Stock, Jan. 1, 1948	35,394	25,924	61,318
Production	199,134	204,861	403,995
Receipts	41,070	30,629	71,699
Oleum feed	—	2,251	2,251
Adjustments	+21	+1,218	+1,239
Use	125,370	76,204	201,574
Despatches	116,834	159,816	276,650
Stock, Mar. 31, 1948	33,415	28,863	62,278

Total capacity represented	222,900	209,520	432,420
Percentage production	89.3 per cent.	97.8 per cent.	93.4 per cent.

RAW MATERIALS

	Pyrites*	Spent Oxide	Sulphur & H ₂ S	Zinc Concentrates
Stock, Jan. 1, 1948	62,000	164,301	47,275	10,511
Receipts	98,957	54,388	91,214	46,275
Adjustments	-308	+339	+4,225	-222
Use	91,108	48,731	66,544	33,664
Despatches	393	3,526	71	—
Stock, Mar. 31, 1948	69,115	166,494	76,090	23,344

* "Receipts" and "Use" include anhydrite "converted" to pyrites.

† Used at works for purposes other than sulphuric acid manufacture.

NOTE.—These figures exclude Government plants, except those producing acid for trade purposes.

SULPHURIC ACID AND OLEUM CONSUMPTION

	Tons H ₂ SO ₄ 100 per cent.
Accumulators	2,176
Agricultural purposes	177
Bichromate and chromic acid	2,361
Borax and boric acid*	—
Bromine	4,087
Chlorosulphonic acid†	—
Clays (fuller's earth, etc.)	1,807
Copper pickling	749
Dealers	4,572
Drugs and fine chemicals	2,596

Dyestuffs and intermediates	19,388
Explosives	3,426
Export	1,012
Formic acid*	—
Glue, gelatine and size	176
Hydrochloric acid	15,601
Hydrofluoric acid	1,178
Iron pickling (incl. tin plate)	22,266
Leather	1,833
Metal extraction	357
Oil (mineral) refining	10,116
Oil (vegetable) refining	1,914
Oxalic, tartaric and citric acid	2,074
Paint and lithopone	14,688
Paper, etc.	971
Phosphates (industrial)	971
Plastics, not otherwise classified	3,477
Rare earths	2,897
Rayon and transparent paper	39,800
Sewage	2,734
Soap and glycerine	918
Sugar refining	171
Sulphate of alumina*	—
Sulphate of ammonia	63,318
Sulphate of barium	1,300
Sulphate of copper	3,747
Sulphate of magnesium	2,507
Sulphate of zinc	698
Superphosphates	134,366
Tar and benzol	4,198
Textile uses	5,769
* Unclassified: Uses known	19,059
Uses unknown	8,692
Total	408,154

RECORD PRODUCTION OF FERTILISERS

SUPERPHOSPHATE produced by the British fertiliser industry during March reached an all-time record of 103,676 tons. The previous best figure was 95,807 tons produced in February. There was an increase in disposal of 87,319 tons over the nine months of July to March as compared with the same period during the previous year.

The production of compound fertilisers in March was also a record at 185,176 tons, and an increase in disposal of 384,007 tons over the months of July to March as compared with the same period during the previous year is reported.

With its capacity at prewar levels, the ingenuity of the fertiliser industry in maintaining its plant in face of adverse war-time conditions is commendable, observes the Fertiliser Manufacturers' Association. This record tonnage is approximately double the pre-war figure, and has been achieved only by intense effort on the part of every member of the industry.

CHEMICAL USES OF "SILENT SOUND"

U.S. Studies of Methods and Material

INCLUDED in the substantial body of scientific material presented at the 113th national meeting of the American Chemical Society in Chicago, which ended last week, is original information on the use of silent sound waves as a new research tool for chemists, and on the wide versatility of polyisobutylene for the production of a diverse range of products.

Supersonics has given chemists a new research tool for fast and accurate identification of complex substances, said Dr. Alfred Weissley, of the U.S. Naval Research Laboratory, Washington, D.C. The velocity of sound passing through a liquid was determined by the chemical composition of the fluid, he stated, and this relationship could be calculated in advance with the aid of mathematical formulae.

Investigations had been conducted on twenty substances with molecules consisting essentially of rings of carbon atoms plus (in some cases) oxygen, nitrogen, or sulphur. Studies had indicated that sound transmission was generally a more accurate means of identification of a liquid than refractive index.

Initiating Reactions

The transformation of one chemical compound into another by intense supersonic waves was described in another report presented by Dr. Weissley in collaboration with Mr. Herbert Cooper, also of the Naval Research Laboratory. They said that iodine was found to be produced instantaneously upon supersonic irradiation of water containing dissolved carbon tetrachloride and potassium iodide.

More than 1000 experiments had been carried out in order to measure how the amount of iodine formed depends on such factors as the container, the amounts of the various starting materials, duration of irradiation, acoustic intensity, and presence of dissolved atmospheric gases. It was concluded that the fundamental chemical reaction takes place in two steps, each of which consisted of breaking off two chlorine atoms from the carbon tetrachloride molecule.

The reaction did not occur, no matter how great the intensity of the sound, unless some gas were dissolved in the solution, they said, explaining that the radiation converts the gas into bubbles, similar to the so-called cavitation bubbles formed by a whirling propeller. The large mechanical or electrical forces which were produced at the collapse of cavitation bubbles were assumed

to be the source of the considerable energy required to break chemical bonds.

Describing polyisobutylene as one of the most versatile synthetic materials, Mr. Vanderveer Voorhees, of the Standard Oil Co., Indiana, said that its products included face cream, machine grease, rubber, and paint. At the present time, its most important use was in the manufacture of butyl rubber, which was widely employed for inner tubes of automobile tyres because it held air better than natural rubber. Polyisobutylene was made from gases evolved in the refining of petroleum. In consistency it ranged from a sticky grease to a rubbery solid, depending upon the conditions under which it is produced; by chemical modification it could be converted into hard plastics and paints.

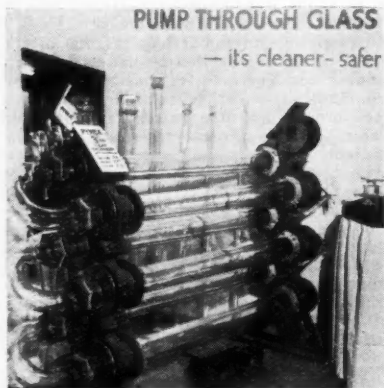
Patents

Among the many polyisobutylene products already patented are: grafting wax for splicing tree branches, cosmetics, plastic adhesive tape, electrical insulation, dripless oils for textile machines (where this is an important consideration), paints that resist corrosive chemicals, and a chemical agent for improving the performance of diesel fuel. Although discovered in Russia in 1873, no further interest seems to have been shown in the material until the 1920's, said Mr. Voorhees, but in the period since 1930, more than 200 U.S. Patents had been obtained.

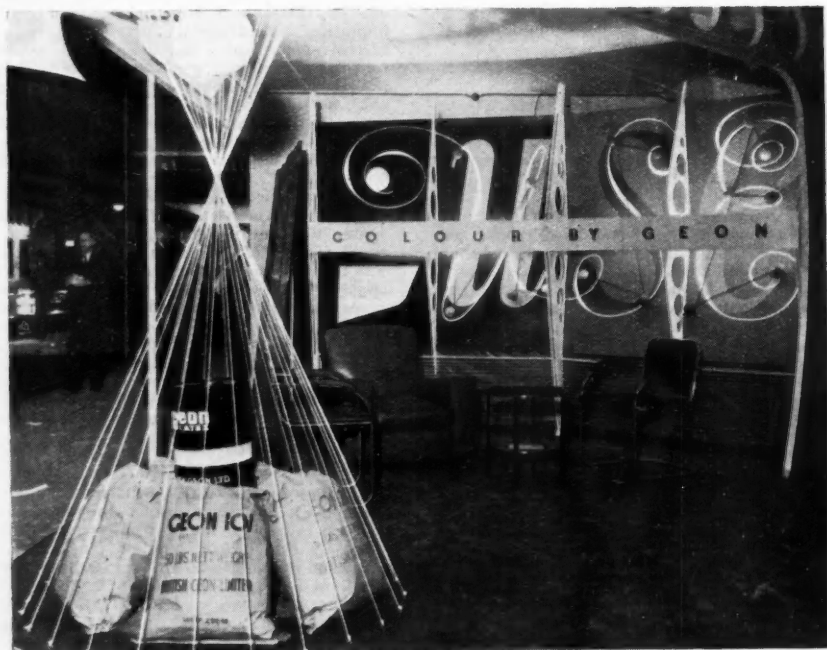
Polyisobutylene, explained Mr. Voorhees, consisted of molecules of isobutylene gas strung together in long chains, and an unusual feature of the manufacturing process was the tremendous speed of reaction at extremely low temperatures. At -80°C . the process could be completed in less than five minutes, during which time giant polyisobutylene molecules were formed, each containing more than a thousand isobutylene molecules. Since best results are obtained at such low temperatures, adequate refrigeration was important, he stated, and one patent required the use of dry ice.

Unesco Awards ACS Scholarships.—The first two scholarships which the American Chemical Society has placed at Unesco's disposal have been granted to Czechoslovakian scientists: to Dr. Miklos Hudlicky, assistant at the Institute for Organic Chemistry, Prague, and Dr. Ivan Wavru, assistant at the Research Institute for Sugar, Prague.

Imaginative B.I.F. Displays

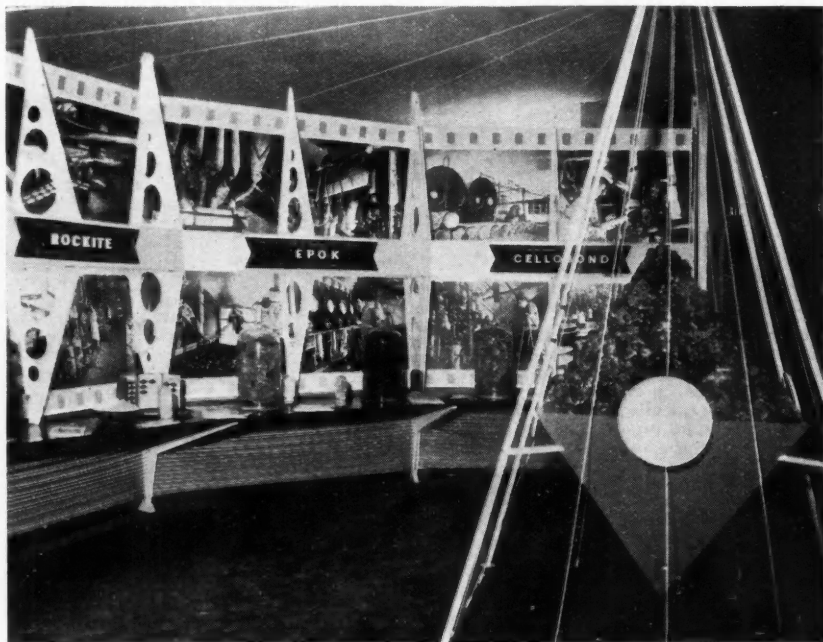


Imagination and enterprise were manifested to the full in the B.I.F. exhibits in the chemicals and plastics sections at Olympia and Earl's Court. Almost as arresting as the more fanciful displays, the massive 10 ft. Pyrex heat exchanger (left) attracted much attention on the stand of James A. Jobling & Co., Ltd. Equally successful was this Picasso-like treatment of colour in industry by British Geon, Ltd.





The modified industrial uses of their lactic acid and lactates and of the related polyacrylate resins in the textile and leather industries were effectively reviewed in pictures on the stand of Howards and Sons, Ltd. (above). Pictures, actual resins and an element of symbolism were combined with notable results by British Resin Products, Ltd. to illustrate their synthetic resins and adhesives



FISCHER-TROPSCH RESEARCH

Tracer Investigation by U.S. Oil Company

A RESEARCH project to probe the secrets of the chemical reactions by which coal and natural gas are converted into gasoline has been launched by the Gulf Oil Corporation, Pittsburgh, Pa. The undertaking, which is being conducted at the Mellon Research Institute, using radio-

of present fuller knowledge of chemical reactions.

The coal-to-gasoline development, based on the Fischer-Tropsch process involves the production, from coal to natural gas, of hydrogen and carbon monoxide, which are then converted to gasoline by passing them over a metal catalyst.

The Theory

It has been assumed—but never proved—that such gasoline is produced by the reaction of hydrogen with metal carbides, which have been formed during the process from carbon monoxide and the metal catalyst. If, however, the gasoline is created by some reaction not involving metal carbide formation, as appears possible, the whole aspect of the process and its commercial application might well be changed.

Of prime importance in the new research project will be the attempt to arrive at a fuller understanding of why and how the catalysts promote the synthesis. The research work, utilizing modern methods, will include the "tracer" system of investigating chemical reactions. Tracer technique involves the use of "tagged" atoms which are chemically identical with other atoms of the same kind but differ in some property such as weight or radioactivity. Thus, when introduced into a reaction, their progress can be followed by sampling at appropriate places and times, and analysing quantitatively for this special property in which they differ from other atoms.

Experimental Methods

In the research on the Fischer-Tropsch reaction a radioactive isotope of carbon will be used which is chemically identical with carbon but which is radioactive and continually emits electrons that can be detected by the Geiger counter. In this research, radioactive carbon 14 is being used as the primary tool in investigating how hydrocarbons are formed.

Radioactive carbon is supplied as barium carbonate. Carbon dioxide, containing the radioactive carbon is released by treating the barium carbonate with acid. A few cu. cm. of this carbon dioxide provide sufficient radioactivity for many experiments. It is desirable, say the Gulf research workers, that for use in this particular work the carbon dioxide be diluted several hundred times and that the radioactive carbon be in the form of carbon monoxide. This is accomplished by mixing



Complicated research apparatus used for laboratory purposes in the production of oil from coal. Dr. J. T. Kummer, Gulf oil research chemist, adjusts the pumping rate while a co-worker fills a flask with liquid nitrogen before precipitating a sample of oil

active isotopes, holds possibilities for improving and perhaps materially altering the future commercial development of the gasoline-from-coal process by further improvement of conversion methods. Research of this kind is needed to ascertain whether existing coal oil technology takes advantage

several cu. cm. of the radioactive carbon dioxide with several hundred cu. cm. of ordinary carbon monoxide and exposing the mixture to the incandescent tungsten filament of an ordinary electric light bulb.

The resultant radioactive carbon monoxide is then reacted with an iron catalyst to form carbide containing radiocarbon. When a mixture of ordinary carbon monoxide and hydrogen is circulated over this catalyst, the hydrocarbon products will show no radioactivity if they are derived entirely from the ordinary carbon monoxide gas rather than from reduction of the iron carbide. If they are derived entirely from reduction of the iron carbide the hydrocarbon products, at least in the initial stages of the reaction, should show a radioactivity comparable to that of the surface of the iron carbide catalyst.

The surface radioactivity of the carbide is judged by hydrogenating a small amount of the carbide to methane and determining its radioactivity. The radioactivity of reactants and products is determined by converting them to carbon dioxide, precipitating this as barium carbonate and placing this solid material before a counter window.

The carbon 14 experiments at about 250°F. show that the hydrocarbon gas formed has less than 10 per cent of the radioactivity it would have if the entire surface of the catalyst reacted entirely through the mechanism of alternate carbide reduction and formation.



A sample of isotope material precipitated from coal-made oil, about to be measured in a Geiger counter by Dr. Kummer

Pakistan Chemical Plans

Much Scope for U.K. Equipment

THE development of chemical industries in Pakistan, based on the salt deposits in the North West Frontier Province and Western Punjab is forecast in a special article in the *Board of Trade Journal* in which trade prospects in the new Dominion are reviewed.

In addition to the manufacture of fertilisers from the large gypsum deposits in the West Punjab, the Government of Pakistan is seeking to stimulate the production of jute, cotton, hides and skins and the development of mineral resources, including oil.

Possible U.K. Trade

The article points out that the most promising openings for the U.K. export trade will be in the provision of capital equipment to implement Pakistan's plans for industrial development. In particular, power plant on a considerable scale will be required, ranging from portable power stations—until hydro-electric development is complete—to small electric motors and oil engines for irrigation purposes.

A Government announcement last month indicated that all possible assistance will be given to the establishment of private industry and the only spheres of production and administration in which the State will participate will be those of armaments, railways, post and telegraphs, broadcasting and hydro-electric power.

Foreign Capital Welcome

Foreign capital will be welcomed, provided that the participation of Pakistan nationals in administrative and technical services is assured. The announcement also contained a Government recommendation that Pakistan nationals should be given the option of subscribing 51 per cent of the capital of certain industries, including cement, heavy chemicals and dyestuffs, minerals, tanning and leather.

Swedish Steel Expansion.—The board of the Fagersta steel works has decided to start immediately the construction of new works at a cost of some 20,000,000 Swedish crowns. It is hoped to start production at the beginning of 1949 and to double productive capacity.

Spectroscopic Equipment Symposium.—A symposium on spectroscopic equipment will be held on May 22 by the Society for Applied Spectroscopy, at Polytechnic Institute, Brooklyn, N.Y. Leading manufacturers will exhibit their instruments at morning and afternoon sessions.

MODERN METHODS OF ANALYSIS—I

Revived Recognition of Basic Principles

From a Special Correspondent

ADVANCE is the hall-mark of a science, and if advance ceases, the science dies. This does not necessarily imply that the importance of any science, either to mankind, or to the scientist, is always increasing. Anyone familiar with the general trends of science through the ages will be prepared to agree that the several branches flow and ebb, sometimes from causes which can be identified and defined, sometimes apparently without reason.

Indeed, in this sense, as well in the more absolute sense, the history of any branch of science is rarely static for any length of time. At a given instant each branch is coming to the fore, or is falling into the background, to await the time when fresh knowledge will give the impetus which will carry it beyond the last tide mark.

Reflects Developments

There are lessons to be learned from the study of these movements in any given branch of science which may in their way prove as valuable as any results achieved in the research laboratory.

Analytical chemistry shows, in a particularly clear fashion, the impacts of various developments in chemistry, and it is relatively simple to trace its development for more than a century, and to adduce causes.

Practically all the great chemists of the late 18th and early 19th centuries were, strictly speaking, analytical chemists for the greater part of their time. Thus much of the work of Berzelius, Blackz and Stas must be considered to have been analytical; the first chemist, Robert Boyle, was deeply interested in problems which nowadays we should, without hesitation, class as analytical, and he must be credited with devising the classification "chemical analysis."

The activity in the analytical field lasted until well into the 19th century, and we can date almost precisely the turning point from which analytical chemistry retired to a sojourn in comparative obscurity until the end of the century. The flowering of synthetic organic chemistry marked the turn of that tide.

Inspired by Wohler's synthesis of urea, the large body of rising chemists were, with few exceptions, tempted by the limitless scope provided by the ability to make many organic compounds, and there was a concurrent disregard of the fact that without analysis synthesis soon becomes impossible.

Thus, while the field of organic chemistry

grew continuously during the last three-quarters of the 19th century, analytical chemistry developed little, and only in a few rather specialised directions, so that the methods in vogue at the turn of the century would not have greatly puzzled the chemist of 1830.

Since then the tide has turned again. If one could translate an analytical chemist of 1830—or, indeed, of 1900—to a fully-equipped analytical laboratory of the present day, it is likely that 90 per cent of the equipment would be completely new to him, while marked alterations would have disguised from him even that residue which derives directly from classical procedures. This altered state of affairs arises directly from yet another of those historical occurrences whose effect on analytical chemistry we can observe directly.

Towards the end of the 19th century there were signs that chemists were becoming interested once more in the fundamental characteristics of analytical chemistry and were realising how vitally necessary it was to the progress of chemistry that each branch should be as up-to-date as the available methods permitted. The opening of the 20th century brought yet another newcomer in the guise of physical chemistry. Just as, in the 19th century, the rising generation of chemists almost automatically became organically minded, so, in the 20th century, all young chemists had a strong bias towards physical chemistry. With all the rival attractions that these two relative newcomers could offer, it is perhaps not surprising that analytical, and indeed, inorganic chemistry, were regarded as fields which had been over-cultivated.

Impact of Physical Chemistry

One might, indeed, extend this rather rough and somewhat accidental simile. It was through the working back into the soil of some of the products of physical and organic chemistry that the most recent expansion of analytical chemistry has come about.

At the end of the 19th century, chemists regarded as analytical procedures methods by which precipitates were obtained in a pure form and weighed, or by which materials were turned into a modification suitable for measurement by solutions of known strength—gravimetric and volumetric techniques respectively. Today the use of the balance and of graduated glassware is likely to be

the least fruitful of the methods with which the trained analytical chemist is on speaking terms.

A few years ago F. E. Brown summarised the position thus: "the field of analytical chemistry is broad, and its mastery requires the application of many skills, techniques and theories. Besides the precipitation, washing, igniting and weighing of the old gravimetric analysis, and the making of standard solutions and finding end-points by means of indicators of the old volumetric analysis, a modern analytical chemist must know how to use microscopes, microbalances, many types of electrical apparatus and vacuum tubes, spectroscopes, polarised light, and X-ray spectra."

This list is by no means comprehensive. As will be shown, it touches only the fringe of the range of instruments which are daily applied to analytical problems. Any analytical chemist who has not handled all this equipment personally—and the range is so vast that it is unlikely that he has—will be familiar with its scope and its limitations. Thus in any particular problem, he will be able to offer sound advice on the quickest, most economical and most reliable route to a solution.

Brown spoke only of instruments. Apart from the techniques themselves, which naturally are of first importance, there is a great field of theory attached. Physico-chemical problems arising in the use of these instruments may range far beyond the scope of physical chemistry, which was considered to be the complement of the analytical chemist in the days of Ostwald. One must take account of the rapidly developing field of organic reagents, which insists that any analytical chemist must have considerably more than a smattering of knowledge about how to find and how to use the many organic compounds which now serve the analyst throughout the inorganic field.

So, while the progress of analytical chemistry has been retarded for a time by the rising of organic and of physical chemistry, these two branches have made invaluable contributions to analytical chemistry. Now the three branches are inextricably linked, and the training of the analytical chemist must, if it is to be properly founded, rest as soundly on these two branches as on the classical science.

Microchemistry

It has been claimed with some justification by a number of authors that the inception of the increased activity of analytical chemistry can be traced to the development of microchemical methods of analysis. Up to the time when Pregl and Emich began to seek ways by which hitherto negligible quantities of material could be analysed,

the classical bias was strong, and there was a tendency to feel that because these amounts had not been amenable to treatment in the past they must remain so.

There were, of course, a few notable exceptions, but it is nevertheless true that much of the development of chemistry was delayed simply because methods had not been devised which would cope with milligram samples. The microchemist began his development by the reproduction of standard laboratory apparatus in miniature. He likewise developed the microchemical balance, which is simply a more refined form of the analytical balance. But later his procedures extended to include new principles and new points of view.

The apparatus and techniques that had been developed for the purposes of physical chemistry in the first instance were diverted to the measurement of properties other than mass and volume, but properties which the analytical chemist was beginning to realise were equally a guide to the nature of the substance being analysed. The reagents of organic chemistry were used to provide new approaches to analytical problems.

(To be continued)

Coal Tar Research

New Association Formed

JOINT research in the coal tar industry is to be undertaken by a new industrial research organisation—the Coal Tar Research Association—which has been set up by the British Tar Confederation, representative of producers and distillers of tar, on the basis of a scheme originally proposed by the Association of Tar Distillers.

Dr. E. V. Evans, O.B.E., F.R.I.C., has been elected first president of the association, and Mr. Richard Robinson is the chairman of the first council.

The council has appointed Dr. D. McNeil as director of research. Dr. McNeil, who takes up his duties in July, is a graduate of Glasgow University. He took his B.Sc. with first class honours in organic chemistry in 1935 and Ph.D. in 1938. After further post graduate research at Glasgow and Manchester Universities as a Ramsay Research Fellow, he joined Imperial Chemical Industries, Ltd. (Billingham Division) in 1940 and has been engaged since then on research on petroleum and coal-tar chemicals. The CTRA will later set up its own laboratories and, meanwhile, use will be made of such academic and industrial facilities as can be procured in various parts of the country.

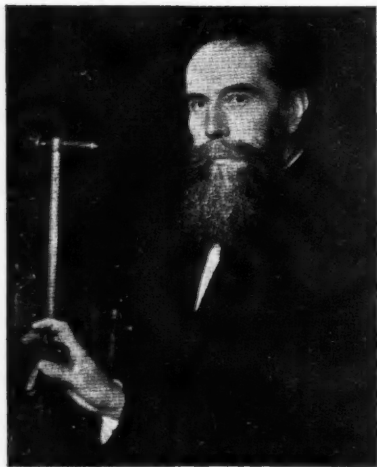
The present offices of the association are at Gas Industry House, 1 Grosvenor Place, London, S.W.1. Telephone No. SLOane 6119.

CHEMISTRY'S DEBT TO RÖNTGEN

Commemorating the 25th Anniversary of his Death

by I. BERKOVITCH, M.Sc., A.R.I.C.

CHEMISTRY—it has been said—studies the behaviour of the outermost electrons of the atom, physics that of the remainder of the atom. Amply illustrating the close inter-relationship of the two sciences are developments from the famous discovery of Röntgen, who died just twenty-five years



Wilhelm Röntgen

ago. Not science alone has benefited from X-rays, but applications within chemistry have been so extensive as to merit attention from all chemists.

In an age of rapidly-increasing momentum in scientific discovery, Röntgen ranks high for his careful experiments in the month of November, 1895, the results of which have been more fruitful than almost any other single study.

Born in Lennep (in the Rhineland) on March 27, 1845, Röntgen was brought up in Holland, whither his family had moved in 1848. At 16 he was expelled from school at Utrecht for refusing to betray a school-mate over some escapade. Despite this serious blow, he was able to continue his education at the Technical School in Utrecht and later at Zurich, where he gained his Ph.D.

He published many papers on various aspects of physics before his major discovery

and was at various times offered the Chair of Physics in a number of German and Dutch universities. He was successively Professor of Physics at Hohenheim (at the age of 30), Giessen and, in 1888, at Würzburg. Here, in the laboratories of the New Physical Institute, while working on cathode-rays, he made his great discovery. A Hittorf tube (a modified Crookes tube) had been enclosed in a cardboard box to exclude light, a Rumkorff induction coil being used as a source of high potential. The glow of a barium platinocyanide screen nearby attracted the attention of the observant Röntgen, who soon established that the existing rays originated in the tube and had penetrated the opaque case.

Early Data

In the next two months, he investigated some of the properties of the rays, taking a number of photographs (including one of his own hand) and investigating the extent to which various materials cut down the intensity of these new radiations. Thus, in his publication of the results of his work on the "unknown X-rays" there was already a large amount of basic experimental data for later workers.

The rays thus discovered—often called Röntgen rays—are pure electromagnetic radiations with wavelengths between 500 and 0.1 Å. They carry no electric charge, so that they are not deflected by electric fields, and their most sensational property is their great penetrating power which, combined with their action on photographic film, renders possible the taking of radiographs. Since the date of their discovery and the taking of the first radiographs, there has been a veritable mountain of discovery of new properties and of new applications.

X-rays are, of course, generated when cathode-rays strike any "target," in a way rather similar to that in which sound waves result from a bombardment of, say, a wall by a succession of projectiles. For many kinds of work with the rays targets are inclined at an angle to the direction of the rays in order to give a greater intensity of radiation in a required direction. For diffraction work, however, the tubes commonly have the anode face perpendicular to the rays.

In the complete electromagnetic spectrum, γ-rays and X-rays are at the short-wave

end, the full spectrum being roughly as follows:—

Radio waves	$10^{14} - 4 \times 10^7 \text{ Å}$
Infra-red	$3 \times 10^6 - 7230$
Visible	7000 - 4000
Ultra-violet	3970 - 200
X-rays and γ -rays	500 - 0.1

As waves, they give interference, diffraction and polarisation effects. Their photoelectric action indicates that they also exhibit particle properties.

Chemical Applications

Within the sphere of chemistry, the main applications have been (1) analysis, (2) elucidation of structures, (3) photo-chemical reactions.

The five general procedures employed in chemical analysis by X-ray spectroscopy are (Clark "Applied X-Rays," 1940).

- (1) Measurement of primary spectral emission lines, using the sample as target in a tube.
- (2) Measurement of secondary fluorescent emission lines by irradiating the sample by X-rays *within* the tube.
- (3) The same procedure, but with the sample *outside* the tube.
- (4) Measurement of absorption edges, using the sample as screen.
- (5) Measurement of primary spectral emission lines, using the sample as external target.

The advantages of these methods are that minute amounts may be analysed without separation, loss or damage, and that a permanent photographic record is produced. These methods have the advantage over optical spectroscopy, of simpler spectra, independence of excitation conditions and of nature of combination.

For qualitative analysis, they cannot be used for elements lighter than calcium, but there are many difficulties in adaptation to quantitative work.

An early triumph in this field was the discovery by Coster and Hevesy (*Nature*, 111, 79, 1923) of hafnium in zirconium by X-ray spectroscopy.

The X-ray Spectrum

The X-ray spectrum is obtained by diffraction, using crystal planes as the diffraction grating. Both transmission and reflection techniques are used. The series of directions along which diffraction occurs is given by $2a \sin \theta = n\lambda$ where λ is the wave-length and n is an integer. In an optical diffraction grating a is the space between the lines; in the case of X-rays and crystals, a is taken as the distance between the crystal planes corresponding with the densest arrangement of atoms. Thus, if λ is known, n can be determined. The lattice constant of rock-salt is taken as standard and λ determined from that. If different crystals are used the spectra obtained from a particular target remain the same, but the scale is altered depending on the nature of the crystal.

The spectrum may be obtained by an ionisation method or by a photographic method. In the former, the rays are reflected from a crystal and passed into an ionisation chamber all mounted on a spectrometer table. The current is plotted against angle of incidence of the rays on the crystal.

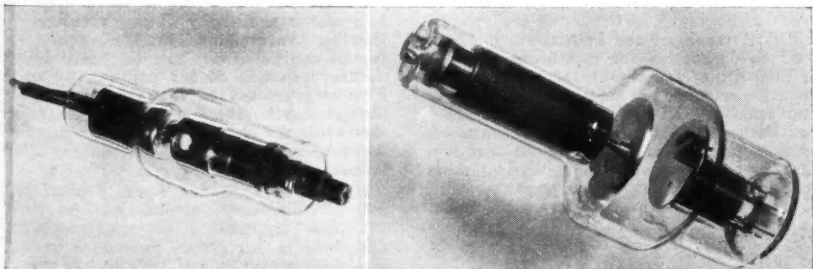
Two groups of maxima were soon found for almost all elements, the long-wave-length series being known as the L series and the shorter-wave-length as the K series.

In 1912, Moseley (*Phil. Mag.*, 26, 1924, 1913; 27, 703, 1914) discovered the relationship

$$\nu^{\frac{1}{2}} = K(z - \sigma)$$

between the wavelengths of one of the K (or L) lines and the atomic number. ν is the frequency, k and σ constants for the K series for all elements, or, where they have them, for the L series.

Later work permitted further resolution,



Lineal descendants of Wilhelm Röntgen's observation and research—two forms of a modern X-ray tube

and the discovery of further groups (M, N, etc.) requiring definite potentials to excite them. Explanation of these phenomena lies in the realm of fundamental atomic theory.

Most materials cannot be obtained as sufficiently large crystals to permit the use of the single crystal technique. A great advance was the discovery by Hull (in America) and Delye and Scherser (in Europe) that crystalline aggregates or fine powders give useful patterns. Thus, metals may be used as fine wires or as small bevelled plates.

This is based on the fact that the beam is intensely reflected only when it meets the crystal at the appropriate angles. In the powder there will be a number of the random orientated crystals which will happen to be at these angles. Thus a homogeneous beam will be reflected only from these.

From the patterns, the known laws—and experience—probable structures can be deduced. But after these models are set up the patterns which *would be given* by these models can be calculated and derived. That which gives the pattern actually obtained is the correct model. Goodeve (*Nature*, 161, 377, 1948) observes that this is a common method of general operational research, applicable to many situations.

Contemporary Uses

Of recent work, one may quote briefly the following:—

Investigations on the crystal chemistry of neptunium and plutonium were reported by Zachariasen at the Institute of Physics' Conference on War-Time Progress in X-ray Analysis, July, 1946. Work on diphenyltrichloroethane derivatives (including DDT) has been reported by Wild and Brandenberger (*Helv. Chim. Acta.*, 29, 1924, 1946).

From Röntgen's own initial experiments the photochemical effect of these rays became evident in the fact of being able to take radiographs. Other X-ray photochemical reactions are known, some being used as dosimeters for measuring quantity or intensity of radiation. Decomposition of organic compounds in solution (Fricke, Hart and Smith, *J. Chem. Physics*, 6, 229, 1938) has been turned to use in the preparation of very pure water. It was found that further to other chemical and physical measures, only prolonged irradiation with X-rays yielded a product free of organic impurities. Clark (V.S.) gives a "Partial List" of the chemical effects of X-rays on p. 194.

Röntgen's first radiograph of his own hand was soon followed by a flood of similar

photographs, and to-day—as is well known—medical science makes extensive use of this valuable method as an aid to diagnosis. By the use of phosphors coated on a screen direct visual observations of a patient may be made. The original barium platino-cyanide has been replaced by cadmium tungstate and this in turn by a special zinc cadmium sulphide.

If it is desired to examine parts which are comparatively transparent to the rays and not differentiated in opacity from surrounding organs, the opacity is increased by "diagnostic opaques." The use of barium sulphate for the gastro-intestinal tract is well known. Less well known is injection of sodium iodide through a catheter for kidney examination and of thorium hydroxide suspension in uterus and cervix examination.

Control of the destructive effects of the rays on living tissue has led to X-ray therapy, applied successfully to growth ranging from warts to cancer.

Industrially, the non-destructive character of examination by radiography has led to ever wider uses, several of which have been noted in previous issues of *THE CHEMICAL AGE*. These are mainly in the sphere of examining articles for internal flaws which would render them unfit for use. Castings, forgings, ceramics and plastics are among the objects examined in this way, while welds are readily examined for porosity and slag inclusion.

Biological mutations are induced by X-rays, a considerable science of radiobiology having developed. While the applications to the fruitfly *Drosophila Melanogaster* are the classic basis of this work, wartime work on *penicillium notatum* was of great significance in yielding new strains of the mould with higher yields of the valuable bacteriostat (*Science News*, No. 6, p. 41).

Great Significance

Forged signatures on documents or paintings are revealed by X-ray examination. Rawlins (*Nature*, 159, 628, 1947) points out that it can be shown how the artist builds up the structure of his painting by using X-rays generated at low potential. Shoe fittings may be checked by X-ray examination while the shoe is on. Defects in existing tables of size relationships have thus been disclosed.

It is clear that the "purely physical" original discovery of Röntgen has had enormous significance in many spheres. Chemists, in particular, owe much to that original observation and have special reason to honour the memory of Wilhelm Konrad Röntgen.

NEW TEXTILE MATERIAL

I.C.I. Plant to Process Groundnuts

ONE of the most promising examples of the conversion of vegetable protein to provide material for the textile industry was discussed in Glasgow last week by Mr. R. H. Thomson (I.C.I., Ltd.). He described the principle which had resulted in the production of Ardil, for the production of which I.C.I., Ltd., is establishing a separate factory near Dumfries.

Mr. Thomson pointed out that Ardil was the third protein textile material yet known, additional to wool and silk and had some of the qualities which the vegetable or mineral fibres lacked.

Wool-Ardil Mixtures

Ardil had been used with wool of lower grade to give higher grade fabric. Mr. Thomson displayed a pullover knitted from a fibre made from wool and Ardil in equal proportion, a hank of wool-Ardil, and tweeds and suitings woven from the mixture. Samples of 50 per cent viscose/50 per cent Ardil materials included flannel, dress material, furnishing fabric, a printed fabric and a headsquare with printed design. Also shown were a sample of an all-viscose cloth, an all-Ardil cloth, and a shantung-type material made from 10 per cent wool, 45 per cent viscose, and 45 per cent Ardil.

An Ardil mixture material, said Mr. Thomson, had about the same crease-resistance as wool when dry, but all-Ardil and all-viscose fabrics had not the same resistance.

Difficult to Distinguish

Replying to queries regarding the method of mixture, Mr. Thomson said this would be accomplished in the carding process or at any other suitable stage according to which fibre the manufacturer intended to

use. Asked whether any ready test could be applied to distinguish Ardil from natural wool, Mr. Thomson said that it would be extremely difficult to do so. It burned and smelled like wool, but it could be distinguished readily under the microscope.

Richest Vegetable Source

By eliminating the sheep and deriving proteins direct from the source, the chemist hoped to obtain a cheaper fibre while offering the equivalent warmth. It had been decided to use groundnuts as the richest source, although soya beans ran a close second.

Groundnuts, which arrived from Africa without their shell, were encased in a red skin in which was a very persistent dye. The skin was removed by bleaching. A meal containing 50 per cent fat was then made, from which the arachis oil was removed by solvent extraction. This left a flour-like substance, of which half was protein. Separation was achieved by dissolving in dilute caustic soda to leave a caustic solution containing the protein, and a by-product for cattle food. The solution was then processed and the protein precipitated. The chemist now had the raw material for his fibre.

Moth Repellent

The material would also dye satisfactorily, would stand up to high-pressure steam, and did not deteriorate under dry heat. Owing to the formaldehyde used in its manufacture, Ardil, unlike wool, did not attract moths. In admixture with wool it considerably reduced the danger, while "straight" Ardil was completely moth-proof.

LAPORTE PLANT EXTENSIONS

IN a letter to stockholders advising them that the recent change of name has now become effective, Mr. L. P. O'Brien, chairman of Laporte Chemicals, Ltd., says that the company and its subsidiary—National Titanium Pigments, Ltd.—are both extending their factories at Luton "to the limits of the potentialities of the site having regard to the nature of requirements and to-day's restrictions."

The company is also constructing at an estimated cost of £715,000 an entirely new hydrogen peroxide plant at Warrington, Lancs, on a carefully selected site. Construction has commenced, but production is not expected before the early months of 1950.

ABCM's EASTERN BRANCH

THE Association of British Chemical Manufacturers announces that its branch office in Bombay will in future be known as the Eastern Branch Office. Its sphere will continue to be India and Pakistan.

Since the opening of the branch office, most cordial relationships are stated to have been formed with the Governments of both States, with the Provincial Governments and with wide sections of trade and commercial interests. The branch manager (Mr. Shuttleworth) is developing the mutual interests of British exporters of chemicals and importers and consumers there, and of exporters in India and Pakistan.

SYNTHESIS GAS SYSTEMS

Four German Processes Reviewed

VARYING German methods of production of synthesis gas, the basis of many liquid fuels, chemicals, pharmaceuticals and dyes, which individually have been the subject of much post-war investigation, are studied in one technical report* lately issued in the U.S.A. It describes and illustrates the Thyssen-Galocsy process, the Lurgi high-pressure process, briefly reviews the Koppers carbonisation-gasification process and includes a summary of the Fischer-Tropsch liquid fuel synthesis. The important synthesis gases were all produced by the gasification of coal and coke.

The Germans used the Winkler generator, the oldest and most widely used apparatus for generating synthesis gas from oxygen, coal and steam. The estimated installed capacity of Winkler generators under German control was nearly 500 million cu. ft. per day, the report states. The Thyssen-Galocsy and the Lurgi processes, introduced during the war, were less extensively used.

Thyssen-Galocsy Process

The Thyssen-Galocsy generator for making gas from coke or coal, oxygen and steam is characterised by its simplicity, and by the fact that it operates at a sufficiently high temperature to melt ash in the fuel processed. Provision is made for withdrawing the molten ash. This feature, the report states, makes it possible to use fuels which cannot be handled by most units because sintered ash clogs the generator. The process is recommended for manufacturing both synthesis gas and heating gas.

To raise the calorific value of the heating gas, it was planned to convert part of the product to hydrocarbons by the Fischer-Tropsch synthesis, and to blend them back into the gas. Professor Galocsy, when interviewed by U.S. Office of Technical Services investigators, claimed that the process had a thermal efficiency of 86 per cent, consumed only 0.15 volumes of oxygen per volume of purified gas, and had a capacity of 1700 kg. of fuel per hour per square metre of grate area. The report contains a description of the process and a drawing of the generator as installed in the Krupp Treibstoffwerke at Wanne-Eickel.

The Lurgi high-pressure gasification process, which converts coal directly to gas by reacting it with oxygen and steam at about

20 atm. pressure, affords the advantages of the reduction of gas velocities through the unit and the simplification of removal of condensable products in the gas stream.

The standard Lurgi generator is a tall cylindrical pressure vessel, water jacketed and partly brick lined. The fuel is introduced through a lock hopper on top of the generator. The charge is dried by hot, crude gases emitted at temperatures as low as 300° C. through an outlet on the side of the dome of the vessel. The dried fuel is carbonised as it passes down the generator and continues to pass down through the reactor to the gasification zone at the base, where it reacts with the steam and oxygen which comes from the bottom through the hollow shaft which turns the grate. The methane formation occurs just above this zone as the gases cool.

The temperature of combustion depends on the melting point of the ash, and is controlled by the amounts of steam and oxygen admitted. Ash is continuously fed to the inlet of an ash chamber below the revolving grate, where it is periodically removed. Tar and benzol in the gas are recovered by conventional methods.

The report contains a number of drawings of various important parts of the Lurgi generator, including the coal feeding mechanism, coal chamber and lock, rotating grate assembly, and ash removal assembly. Detailed drawings show smaller parts.

Koppers Gasification

The report also contains a description of the manufacture of synthesis gas in a Koppers combination gasification and carbonisation unit at the largest Fischer-Tropsch plant in Germany. The process, said to be very successful, consists of distilling coal briquettes followed by partially gasifying the semi-coke with hot steam lower in the retort, and finally cooling the coke in the lowest section of the vertical retort. Two drawings show the plan and side elevation of the gasification and carbonisation unit.

Coal Distillation Scheme.—The Scottish Reconstruction Committee is to press for the reconsideration of a scheme for distillation from coal, which was advanced by the committee some considerable time ago and deferred until fuel became more fully available. At the recent annual meeting the committee urged that plans should be approved as soon as possible and fuel and material allocated to the work.

* *Gasification of Coal*, 44-pp. mimeographed report, No. PB-80330; The Office of Technical Services, U.S. Department of Commerce, Washington, 25, D.C., \$1.50.

Mechanical Seal for Process Pumps

Valuable Innovation Shown at Castle Bromwich

USEFUL information for chemical engineers is contained in "Oil," Vol. 1, No. 1, the first issue of the official journal of the Manchester Oil Refinery group of companies. This contains, among other things, a description of the new type of mechanical seal now being produced by Flexibox, Ltd., a member of the MOR group. This has proved one of the more interesting of the company's exhibits at the Birmingham section of the B.I.F. Although it has been specifically designed for oil refining process pumps, wide and increased use of the seal in chemical engineering is possible.

Type RR seal is said to be used in British and overseas refineries, while orders are in hand for others under construction. Type F and Type R seals are available for the food processing industry and refrigerator compressor crankcases respectively. The company is prepared to undertake the production of seals for special requirements.

Spring Drive

A unique feature of the seal, says "Oil," is the patented spring drive. The spring (7), made from stainless steel, is an interference fit on the thickened portion of the shaft sleeve (8) on one side, and on the neck of the rotary seal ring (5) on the other side. In addition, the effect of winding the coils of this spring is such that, in opera-

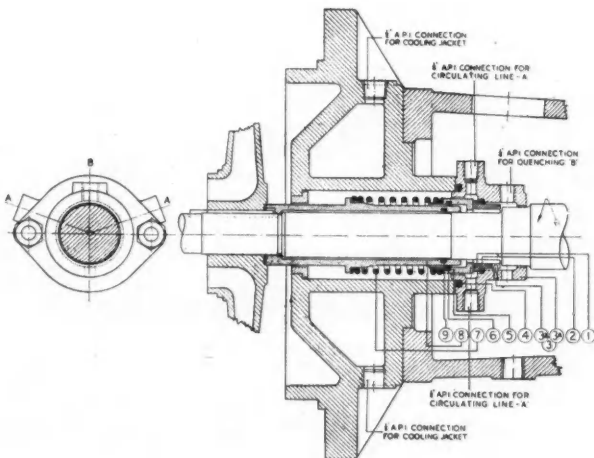
tion, it tends further to increase its grip. Consequently, the rotary seal ring (5) is driven positively yet resiliently and the static seal (6) is not subjected to any frictional wear. Prolonged tests with various designs of seals have shown that erratic behaviour is usually due to side-thrust transmitted to the rotary seal ring by driving pegs, screws, tongues, etc. The spring drive incorporated in the RR seal is a perfect solution to this problem.

STEEL RESEARCH

"RESEARCH is a fundamental part of the company's activities, and our programmes are planned over a considerable period of time," said the Rt. Hon. Lord Aberconway, chairman of Thos. Firth & John Brown, Ltd., in the course of his address to the 67th ordinary general meeting last week. Research results were to be seen in the steels developed for use in high-pressure steam installations, and now for use in the gas turbine. The large programme of development initiated in 1945 was now approaching completion. The chairman added that it was expected to put into operation later this year the new heavy rolling mill, which will considerably improve the company's capacity for finished steel.

Principal Components

- 1 Stationary Seal Ring
- 2 Cover Seal
- 3 Cover Assembly
- 3a Cover
- 3b Pin
- 4 Joint Ring
- 5 Rotary Seal Ring
- 6 Sleeve Seal
- 7 Spring
- 8 Shaft Sleeve
- 9 Shaft Seal



\$30 M. MORE FOR RESEARCH

E.I. Du Pont Experimental Station

"INDUSTRIAL chemical research is now so complex that highly complicated equipment and specialised technical services, demanding heavy investment, are required for the thorough exploration of new fields," said Mr. Crawford H. Greenewalt, president of the (U.S.) E. I. Du Pont de Nemours Company, announcing a \$30 million expansion of research facilities at the company's experimental station, Wilmington, Delaware, which has been approved and awaits ratification by the directors. This is the biggest single laboratory project the company has ever undertaken and with construction plans calling for ten new laboratory and semi-works buildings for long-range research and development of new chemical discoveries, it will make the experimental station one of the largest research establishments in the world.

Staff of 2500

When the expansion is completed in about 2½ years, the company expects to have 900 technical employees engaged exclusively in research work at the station, of which about 200 will be transferred from other laboratory locations. There are now approximately 500 at the station and it is expected that the total of all employees, technical and non-technical, will approximate to 2500. Some of the company's research organisations now located elsewhere will transfer to the new facilities. Already at the station are laboratories of the chemical, engineering, Graselli and ammonia departments, the nylon laboratory and the Haskell toxicological laboratory, and they will be joined by the Rayon Pioneering Laboratory, by research personnel of the plastics and pigments departments, and by additional Graselli department research activities.

The chemical department, which is devoted exclusively to research, will use its new facilities primarily for fundamental research without regard to immediate commercial use.

Many of the new facilities will also be used by manufacturing departments for applied research, to include further investigations of nylon, rayon and other fibres and films and the development of new materials in these categories; work aimed at major developments in pigments and related products; investigations for long-range developments of plastics; expansion of long-range research on new products and processes for agricultural and industrial chemicals, and development of products of high-pressure synthesis.

The design of the buildings employs units of two-man laboratories, generally 19 by 25 ft. There will be about 150 of these in addition to others of different sizes for special purposes.

The plan provides two 10-ft. fume collecting hoods and complete services in each unit, one on each side of the room. The most modern of safety equipment will be installed as well as full ventilation. Full daylight effect will be provided in each unit by fluorescent lighting. Buildings housing the laboratories will be constructed of steel, concrete, and brick with red brick facing and limestone trim. Electricity and other services will be distributed underground and provision will later be made for air conditioning.

Welding Congress

18 Countries to Meet in Brussels

By invitation of the Institut Belge de la Soudure, the inaugural meeting of a new international body, the International Institute of Welding, will be held in Brussels from June 8 to 11. It is expected that 18 countries will be represented at this gathering and invitations have been sent to welding societies in all parts of the world inviting them to send delegates to register their support of the institute. The technical meetings will also be open to all who are interested in welding. The programme of the conference includes the presentation of the following papers: "The Possibilities of Determining and Relieving Residual Stresses" (M. Walter Soete), "Scientific Studies with Reference to the Applications of the Oxy-acetylene Flame" (M. Willy Bonhomme), "The Detection of Defects in Welded Construction" (M. Georges Homes), "The Present Position on Residual Stresses in Welded Structures" (Mr. R. Week, Great Britain), "Oxy-acetylene Pressure Welding" (M. C. G. Keel, Switzerland), "Evolution of Metallurgical Problems in Welding: Hardening Phenomena" (Professor A. Portevin and collaborators, France), and "Mathematical Treatment Yields Explanation of Brittle Fractures" (Professor F. K. Th. van Iterson, Netherlands). The official languages of the conference are English and French.

Those intending to take part in the conference should communicate with the secretary of the Provisional Committee, Mr. G. Parsloe, The Institute of Welding, 2 Buckingham Palace Gardens, London, S.W.1.

Short Supplies of Plastics Materials

IN his recent address to the 18th ordinary annual general meeting of British Paints (Holdings), Ltd., Mr. J. W. Adamson, chairman, said that the new and pure varnish media had definitely come to stay. They were not in any sense substitutes, since they improved the quality of paints and varnishes.

Synthetic Resins

The company's synthetic resin works at Dunston-on-Tyne was now in full production, but owing to inequitable distribution of certain raw materials, it had not been able to keep the paint, linoleum, printing ink, and plastics industries as well supplied as they should be. Mr. Adamson thought the raw material supplies for the plastics industry were particularly inadequate.

In a reference to imminent overseas expansion, the chairman said: "Negotiations are almost completed whereby your company will have controlling interest in one of the best known paint manufacturing companies in South Africa."

On the subject of research, Mr. Adamson said new laboratories were to be built to house the large number of chemists now employed. Technicians also had to be trained for the company's overseas factories.

Czech Plant for Australia

THE Czechoslovak Metal and Engineering Works, a Czech Government organisation comprising all the major engineering firms in Czechoslovakia, including the Skoda Works, is reported to be planning to supply a wide range of chemical plant and similar equipment to Australian industry. It is announced that orders can be accepted for complete plants for the manufacture of paper, fertilisers, cement, metals from ores, industrial chemicals, soap, fuel, refractories, oxygen and other gases.

The organisation has already set up an Australian office in Melbourne, Victoria, and a determined attempt to gain valuable Australian orders may be expected.

FLUORESCENT LIGHTING IN A CHEMICAL LABORATORY



Planners of this modern chemical laboratory extension at University College, Southampton, have achieved a relatively shadow-free illumination by means of fluorescent lighting. Observe the arrangement of the light sources between the benches rather than over them

(Lighting planned by the B.T.-H. Co. Ltd., and installed by F. W. Cook & Co. (Southampton), Ltd.)

American Chemical Notebook

From Our New York Correspondent

A BILL to create a National Science Foundation, which will be engaged in basic scientific research, has been accorded quick and unanimous approval by the U.S. Senate. The Bill, which now goes to the House of Representatives, where little opposition is expected, would set up a foundation of 24 members chosen by the President from leaders in science, engineering, education, and public affairs. They would be headed by a \$15,000-a-year director, and their terms of office would last six years. The measure had been vetoed by President Truman last year because he had not been given authority to name the foundation's director. The function of the foundation would be to develop a national policy in promoting basic research and scientific education, make grants and loans for research, award scholarships and fellowships, and promote exchange of scientific information on an international basis.

* * *

A new resin base, thermoplastic material, known as Versalite, described as tough, light in weight, and suitable for formation into irregular and compound shapes as large as 5 ft. by 10 ft., is now available. The plastic is made in almost any thickness above 0.20 in., can have solid colour throughout, with constant colour finishes varying from dull to gloss or embossed, and it will not chip or warp.

* * *

Mr. Henton Morrogh, research manager of the British Cast Iron Research Association, Alvechurch, Birmingham, addressing the 52nd annual congress of the American Foundrymen's Association, at Philadelphia, last week, revealed a new method of producing grey iron of greatly improved physical properties. The new metal, Mr. Morrogh said in his paper "The Production of Nodular Graphite Structure in Grey Cast Iron" (THE CHEMICAL AGE, May 1) would have far wider commercial application than the present metals. The process involved effecting a structure in the metal which metallurgists have been trying to obtain for years. The chief characteristics of the metal are said to be increased impact resistance, tensile strength and longer life. Following the presentation of the paper, Mr. Thomas H. Wickendon, vice president of International Nickel Company, New York, said his firm had been working independently on a method for achieving the same effect, and was on the verge of announcing the results of successful tests.

A petroleum chemicals laboratory with facilities for complete technical service has been completed at St. Louis, Missouri, by the Monsanto Chemical Co. An unusual feature is the central control hall, from which tests in surrounding engine cells may be controlled and observed, free of distraction and noise. In addition to handling routine analyses of base stocks, the chemical laboratory is equipped to conduct stable pour-point analyses by cyclic temperature tests, channel point and rust protection tests of gear oils, plus analyses for metal, phosphorous, sulphur, and chlorine.

* * *

In search of a new source of high-grade process fuel for the growing metallurgical industries of South America and the Pacific Coast, the U.S. Bureau of Mines has established that low-volatile coal from the Oyon field some 40 miles west of Cerro de Pasco, Peru, provides under carbonisation tests 83.7 per cent coke, 10,200 cu. ft. of gas to each ton of coal, 4.7 gal. of tar, 1.27 gal. of light oil, and 8.7 lb. of ammonium sulphate. Only small-scale mining has been carried on for many years, some of the coal being used for manufacturing carbide at Oroya. In recent years, small-scale coking operations in specially designed ovens in the region have demonstrated that this coal will make dense coke.

* * *

The production of coke from coal-gas retorts in the United States in 1947 declined 12 per cent below the 1946 level and totalled 664,576 tons. This sharp decrease, in spite of the extremely heavy demand for gas by industrial and domestic consumers, was due principally to the substitution of water-gas, natural gas, and liquefied petroleum gas for coal gas at a number of installations. This replacement of coal gas resulted in the dismantling of 729 retorts in 1947, thereby reducing the total number of retorts of all types at the end of the year to 1419. Of this number only 1154 were active on December 31, 1947. The quantity of coal carbonised decreased 12 per cent from 1946, but the average cost of coal at producing plants increased \$1.15 per ton, or 16 per cent. As coke is a secondary product in the manufacture of the main product—gas—more emphasis is placed on the marketing of the gas and usually about 50 per cent of the coke produced is used by the producers for heating benches, for manufacturing producer gas and water gas, and for other miscellaneous plant uses.

Home News Items

Cement Shortage Curtails Building.—Edinburgh's housing schemes are being jeopardised by the acute shortage of cement in Scotland. Existing stocks at the disposal of the housing committee were said last week to be sufficient only for 14 days' building.

Cold Cure: Negative Result.—Experiments in Glasgow by the Education Committee on the effectiveness of anti-cold treatment for employees have not been a success the committee states. Treated and untreated groups of employees showed that results were practically identical in both groups.

Chemical Prices Reduced.—Following recommendations by the Federation of British Industries, Albright & Wilson, Ltd., announces reductions of approximately 2 per cent on the prices of some of their main products. These prices will be effective from May 10. The products concerned are stick phosphorus, calgon, acid sodium pyrophosphate, acid calcium phosphate and pure phosphoric acid.

Joint U.S.-Scottish Engineering Project.—Details of a £1 million expansion plan at the Kuwait Oil Company's wells in Persia are being worked out by representatives of the Chicago Bridge Company, which will supply the fabricated steel parts for the new oil tanks, and the Motherwell Bridge and Engineering Company, which will provide fitters to erect them. Revenue from the work will be shared approximately equally by the two firms.

R.A.F. Aid for Seaweed Industry.—In order to assist the Scottish Seaweed Research Association in the establishment of a £15 million seaweed processing industry in Scotland, Royal Air Force units are taking air photographs of the entire coastline of the Orkneys, Islay and Jura groups to ascertain where seaweed could be obtained in quantities suitable for economic processing. The association plans to develop a mechanical harvester to gather the weed.

Microchemists Meet in Aberdeen.—Microchemists concerned with trace analysis and ultra-micro quantities visited Aberdeen centres concerned in this work last week. The meeting, sponsored by the microchemistry group, local sections of the Chemical Society, the Royal Institute of Chemistry and the Society of Chemical Industry, heard experts from various parts of the country. Mr. Norman Stafford, head of the Analytical Division of I.C.I., Ltd., presided.

Tin Allocations.—The Ministry of Supply announces the following interim allocation of tin metal by the Combined Tin Committee for the first half of 1948, additional to those previously announced:—Austria, 300 tons; South Africa, 60.

British Celanese Plant Approved.—Government sanction has now been given to the erection by the British Celanese Company of what will be its principal factory on the Wrexham trading estate for the production of fabrics and plastics. It will cost approximately £2 million and employ about 4000.

Crucible Co. Factory.—Permission has been given for work to begin on the building of a factory at Neston by the Crucible Co., whose products are big dollar earners. It is expected that Neston's small number of unemployed will be completely absorbed either in the erection of the factory or in ultimate production, which is scheduled to commence within the next 12 months.

Electrical Production of Steel.—The second electric arc furnace has been started at Brymbo Steel Works, Wrexham, as part of the increased production drive. The first electric furnace was reopened last month after the plant had been idle since March, 1946. During the war the electric furnaces were installed for the manufacture of alloy steel for aircraft.

Applied Photography Exhibition.—Irish industry is to see the Kodak Exhibition of Applied Photography, which toured English and Scottish industrial centres last year. By photographs and practical exhibits every process by which modern photography aids industry is explained. The Exhibition will be on view at the YMCA, Wellington Place, Belfast, from June 21-25, and at Mansion House, Dawson Street, Dublin, from July 5-9.

The Kinninmont Prize.—The annual competition for the Kinninmont Prize—a scholarship to the value of ten guineas, in chemistry, physics and botany, tenable at the Royal Technical College, Glasgow—will be held in June. The competition is open to all students in the area covered by the Glasgow and S.W. Scottish Branch of the Pharmaceutical Society of Great Britain who are attending or have attended an approved course of instruction for the Intermediate examination.

PERSONAL

MR. RONALD SMITH HORSFALL, Hartley Road, Birkdale, Southport, retired commercial chemist, left £25,272 (net £25,188).

MR. J. R. PARK, director of research and development, British Oxygen Co., Ltd., has been appointed to the board as assistant managing director.

DR. J. W. M'DAVID, chairman of the Explosives Division, I.C.I., Ltd., is to serve on the Western District Advisory Committees of the Scottish Board for Industry.

MR. KENNETH GORDON is relinquishing his position as joint managing director of Billingham division, I.C.I., Ltd., to join the board of Trinidad Leaseholds as technical director.

PROF. B. G. MAEGRAITH, Dean of the Incorporated Liverpool School of Tropical Medicine, is presenting a paper on paludrine to initiate a discussion on malaria at the fourth international congress on tropical medicine and malaria in Washington (May 10-18). He is to present lectures throughout America and will return home in June.

The marriage has taken place of DR. MARY MARGARET TOTTEY, a doctor of philosophy and a bio-chemist, of Croome Drive, West Kirby, and DR. RICHARD TOWNSEND, of Knutsford, Cheshire. Both are members of the same team of research workers engaged on paludrine, at the Liverpool School of Tropical Medicine.

PROF. P. S. GILL, of the Indian Tata Institute of Fundamental Research—it conducts research in atomic physics—is going to the Carnegie Institution, Washington, where for six months he will be engaged upon special research work on cosmic rays. He will work under Prof. M. S. Vallarta, formerly of the United Nations Atomic Energy Commission.

British Aluminium Appointments

The British Aluminium Co., Ltd., announces that MR. H. H. CUNDELL has been appointed sales manager, and MR. A. W. LANGHAM, who temporarily undertook responsibility for sales and sales planning departments, following the appointment of Mr. E. A. Langham to India last year, will continue as sales planning manager. MR. E. E. SPILLETT, who has been appointed development manager in succession to Mr. Cundell, will have as his assistant, MR. P. S. W. SWABEY.

Obituary

MR. DAVID J. THOMAS, managing director of the Welsh Tinplate and Metal Stamping Co., Ltd., has died at Llanelly at the age of 65.

MELDOLA MEDAL, 1947

ON the recommendation of the Council of the Royal Institute of Chemistry, the Society of Maccabaeans has decided to present the Meldola Medal for 1947 to Dr. James Baddiley in recognition of the outstanding contributions he has made, before he was 30, to knowledge in the field of nucleoside chemistry and related subjects.

Dr. Baddiley worked with Prof. A. R. Todd at Manchester University on a synthetic approach to the study of nucleosides involving the development of new methods. He was awarded the M.Sc. in 1942 and Ph.D. in 1944 on the results of this work.

After a period of work on penicillin chemistry under a grant from the Medical Research Council, he was awarded an I.C.I. Fellowship and resumed work with Prof. Todd at Cambridge, on the chemistry of the nucleosides, particularly those possessing co-enzyme function. He is at present spending a year at the Wenner Grens Institut, Stockholm, to extend his knowledge of nucleosides on the biological side and to acquire tracer technique for his future investigations.

The Council of the Royal Institute of Chemistry has invited Dr. Baddiley to deliver a lecture on some aspect of his work on his return to England early in 1949 and the Meldola Medal will be presented to him then.

SANDOZ EXPANSION

SANDOZ A.G., Basle, Switzerland, makers of chemicals, dyestuffs and pharmaceutical products, reports an expansion both in production and sales during 1947. It notes, however, that a new type of protectionism, affecting imports and foreign exchange, is becoming evident on a world-wide scale. Increased sales for the company's dyestuffs are reported from the leading European markets while markets elsewhere were adversely influenced.

Sales of auxiliary products for the leather, paper and textile industries developed satisfactorily, but were partly hampered by quotas and by transfer restrictions. Sales of agricultural chemicals declined as a result of the drought in Switzerland, and by a noticeable pressure on the level of prices elsewhere.

Pharmaceutical products found ready and increasing markets, and several new lines were introduced. Good results were achieved by the alkaloid department.

Net profit for 1947 totalled 12,275,277 Swiss francs, an increase of 2,340,000. A further contribution of 300,000 francs has been made towards meeting the cost of the expansion of the Department of Chemistry at Basle University.

Overseas News Items

Chilean Nitrate for Egypt.—Chile is to export some 10,000 metric tons of nitrate of soda to Egypt additional to normal supply arrangements.

Italian Lead and Zinc Exports.—The Italian Ministry of Foreign Trade has given assurances that licences will shortly be granted for the export of a limited quantity of lead and zinc.

Dutch Chemicals for Italy.—The new commercial agreement between Italy and Holland includes the importation into Italy of 5000 tons of benzol, 500 tons of fire-enamels, 200 tons of scrap rubber, 2000 tons of elastic rubber, and 2100 tons of resins.

Sweden Acquires German Plants.—Two German-owned chemical companies in Sweden, Henckel and Helios, are to be sold to the Swedish Co-operative Association by the Swedish Government, which is at present administering German property.

Peruvian State Petroleum Co.—The Government of Peru has announced the establishment of a fiscal petroleum enterprise to engage in oil production. Private capital, both foreign and domestic, in the Peruvian oil industry is said still to be welcome.

New Ethylene Process.—The Socony Vacuum Oil Co. has developed a new process for making ethylene—the "Thermoform pyrolytic cracking process." Low-grade crude oil and residual oil is being used as starting material and the expensive process of separation is reported to have been eliminated.

Seaweed Studies in Argentina.—The Bureau of Industry and Commerce of the Province of Buenos Aires, Argentina, has announced the formation of a seaweed division to study the industrial possibilities of the large resources of this material found on the Argentine coast. A comprehensive programme requiring long study has been planned.

Italian Dyestuffs Production.—During 1947 Italian firms produced approximately 20,000 tons of dyes and 50,000 tons of intermediary materials used in the production processes. Subject to satisfactory supplies of raw materials and coal, Italy hopes this year to export 10,000 tons of dyestuffs and 25,000 tons of intermediary products. Since the war the Italians have captured many markets previously dominated by Germany and numerous firms are expanding rapidly, confident in their ability to resist any future German competition.

Franco-Venezuelan Oil Arrangement.—France is reported to have undertaken to supply Venezuela with 10,000 metric tons of drilling pipe in exchange for petroleum.

France Relaxes Price Control.—Price control has been removed in France from a number of chemicals, including sodium phosphates, sodium and potassium cyanide, hydrochloric acid and lamp black.

Steel for Atomic Projects.—The U.S. Secretary of Commerce has announced that American steel producers have tentatively agreed to guarantee 160,000 tons of steel for atomic energy projects between July next and February, 1949.

Leverkusen Plant's Revival.—The Leverkusens, chemical and dyestuff plant is stated to have achieved a remarkable revival. Additional to its usual production programme, pharmaceutical and rubber products and photographic materials are now being made there.

Montecatini/U.S.A. Development.—The Italian mining and chemical group, Montecatini, expects to conclude an important agreement for close collaboration with a leading U.S. chemical concern. Some 150 of the group's works and mines are now in operation, as compared with about 50 in 1945.

Argentine Tin Smelter.—The establishment of a Government-controlled smelter for Bolivian tin has been arranged by the Argentine Government. The Department of Military Manufactures is empowered to decide whether the smelter shall be operated by a mixed company or placed under the management of a firm already in existence.

Potash Search in N. Germany.—A search for deposits of potash and rock salt has begun in the Bremen region of N. Germany involving the expenditure of some Rm. 600,000. Potash deposits were discovered in this area some years before the war, but no exploitation has so far taken place.

Rising German Chemical Totals.—The steadily increasing revival of German exports of chemical products, dyestuffs, pharmaceuticals, etc., is evidenced by the fact that exports from the U.S. zone in the first quarter of the current year exceeded total imports for last year. Basic chemical exports of \$2,764,100 in the first three months compare with about \$570,000 during 1947. The figures for dyestuffs were: \$1,638,500 (\$2,519,400) and pharmaceutical products exported were \$230,600, compared with \$549,300 during the whole of last year.

DSIR "At Home"

THE Chemical Research Laboratory, DSIR, Teddington, is again holding a series of "open days" in July, when representatives of industry, Government departments, universities and technical colleges will be invited to inspect the laboratory and to view the work in progress. There will be three sessions: afternoon July 1, morning and afternoon July 2. In view of the interest expressed it has been decided to issue invitations to industry on an increased scale. The director (Dr. R. P. Linstead) will be glad to receive applications from industrial firms wishing to send representatives. The five main branches of research are:—(a) Corrosion of metals; (b) High polymers and plastics; (c) Coal tar constituents; (d) Organic intermediates; (e) Inorganic chemistry. Particular attention is paid at the laboratory to new techniques of general usefulness.

LIQUID FUEL CONFERENCE

THE Institute of Petroleum and the Institute of Fuel are holding a joint conference on "Modern Applications of Liquid Fuels," at Birmingham University from September 21-23. Its purpose is: "To place the technical considerations involved in the utilisation of liquid fuels, at this time, before the fuel-using public, indicating the proper place of alternative fuels in various circumstances."

The programme so far arranged or projected, includes papers by Mr. T. C. Bailey (Shell-Mex and B.P., Ltd.), Mr. J. S. Jackson, Prof. L. Aitchison (University of Birmingham), and Mr. A. J. Fisher (U.S. Bethlehem Steel Corporation).

Application for membership of the conference should be made to the general secretary, Mr. R. W. Reynolds Davies, 18 Devonshire Street, W.1.

Chemical Wages Increased

With effect from the first full pay week following March 1, says the *Ministry of Labour Gazette*, April, skilled engineers, electricians, boilermakers, pipefitters, apprentices, youths and boys employed in the heavy chemical industry received increases of 1½d. an hour in the minimum rates for men and of proportional amounts for apprentices, youths and boys. These changes, it is added, do not apply to constituent firms of I.C.I., Ltd. Minimum rates after the change are: London district 2s. 11½d. an hour; elsewhere 2s. 10d.

Next Week's Events

TUESDAY, MAY 18

Oil and Colour Chemists' Association (London Section.) Royal Society of Tropical Medicine and Hygiene, Manson House, Portland Place, W.1, 7 p.m. A. H. Alexander: "Emulsions."

WEDNESDAY, MAY 19

Royal Statistical Society (North-Eastern Group.) Newcastle Chemical Industries Club, 18 Lovain Place, Newcastle-on-Tyne. 6.30 p.m. K. A. Brownlee: "Experiments in Industrial Chemistry."

WEDNESDAY, MAY 19—FRIDAY, May 21

Engineering and Industrial Equipment (Home and Export) Exhibition. Old Royal Horticultural Hall, Vincent Square, S.W.1. 9.30 a.m. to 7.30 p.m. daily.

THURSDAY, MAY 20

Institution of Mining and Metallurgy. Rooms of the Geological Society, Burlington House, Piccadilly, W.1, 5 p.m. General meeting.

Chemical Society. Burlington House, Piccadilly, W.1, 7.30 p.m. Prof. J. D. Bernal: Victor Moritz Goldschmidt Memorial Lecture. (Hull Section and University College Scientific Society.) University College, Hull, 6 p.m. R. P. Bell: "Kinetics of Some Organic Halogenation Reactions."

FRIDAY, MAY 21

Chemical Society (Newcastle and Durham Section.) King's College, Newcastle-upon-Tyne 1, 5 p.m. Prof. A. R. Todd: "Modern Theories of the Mechanism of Drug Action." (Bedson Club Lecture.)

SATURDAY, MAY 22

Society of Chemical Industry (Agriculture Group.) East Malling Research Station, Maidstone, Kent, 12 noon. Annual general and summer meeting.

Electrodepositors' Technical Society. Hyde Park Hotel, Knightsbridge, S.W.1, 7 p.m. Annual dance.

U.K. Tin Position

Stocks of tin metal held by the Ministry of Supply at March 1 amounted to 6805 long tons. After receiving new production (3040) and making deliveries to U.K. consumers and for export (2498), stocks at March 31 amounted to 7347 long tons. Consumers' stocks at 2832 long tons on March 1 were increased by Ministry deliveries of 2381 during the month but reduced during the same period by a consumption of 2347, leaving stocks on hand at March 31 of 2866 long tons.

Parliamentary Topics

Gas Supply for State Industries.—Mr. Robens, Parliamentary Secretary, Ministry of Fuel and Power, answering criticisms of Clause 50 in the Gas Bill, which deals with charges and tariffs, assured members of the Standing Committee this week that gas would not be supplied to nationalised industries on advantageous terms.

Coal/Oil Conversion.—In a statement on the coal/oil conversion programme, Mr. H. T. Gaitskill, Minister of Fuel and Power, recalled that it was started in the spring of 1946, at a time when coal stocks were shrinking and there was plenty of fuel oil. By June, 1947, however, the oil supply position had changed radically, and it was decided that no more conversion schemes could be authorised. By December, 1947, largely owing to the astonishing increase in American consumption, the world shortage had become more acute and it became necessary to defer the completion of unfinished schemes authorised earlier in the year. There had since been little improvement, while the closing of the Haifa refinery has created fresh difficulties. Accordingly, it would not be possible at present for all the postponed schemes to come into operation, and in the majority of cases the firms concerned had to continue to burn coal, probably for some considerable time to come. The only exceptions would be schemes of conversion which had exceptional economic merit, e.g., in certain cases of steel, glass and pottery production, where the actual process of converting to oil was nearly complete. The firms concerned would be notified shortly.

Coal Industry Output.—Replying to Mr. Osborne, the Minister of Fuel and Power declined to make a statement on the subject of the resolution sent to him by the Scottish area of the National Union of Mineworkers demanding a complete and unqualified withdrawal of the statement made by Sir Charles Reid, production director of the National Coal Board, that though more machinery is being sent to the pits, output per man is falling.

Idle Magnesium Factories.—Replying to Mr. Elwyn Jones, Mr. J. Freeman said on behalf of the Minister of Supply: Three Government owned factories were producing magnesium in 1945 and the premises were still Government owned. There was at present no production of new ingot magnesium. Stocks in this country were sufficient to meet demand for some time to come.

Official Notices

Changes in Poisons' Regulations.—By the Operation of the Poisons List (Amendment) Order, 1948, and the Poisons (Amendment) Rules, 1948, which becomes effective on Monday, the following substances are added to Part I of the Poisons List and to the First Schedule to the Poisons Rules: Amidone (dl-2-dimethylamino-4: 4-diphenylheptane-5-one); its salts; carbachol; alkaloids of curare, and curare bases (this is in substitution for "Curarine," which is now deleted from the list and the schedule). Metopon (methyl dihydromorphinone) and its salts; sodium monofluoroacetate. Allylisopropylacetylurea is deleted from the seventh schedule and added to the fourth schedule to the Poisons Rules. This substance thus becomes subject to the same conditions with respect to supply and labelling as the barbiturates and sulphonamides.

A new rule (14A) has been made which replaces, with some extension of the list of substances affected, the Poisons Colouring Rules 1936, which are now revoked. Under this new rule the requirement as to colouring is widened to include arsenical poisons intended for the treatment of any infestation, lead arsenate paste and powder must now be coloured, and the colouring must be of such a nature as to be apparent whether the poison is dry or wet, or in solution.

Copies of the Order and Rules (price 1d. each net) may be purchased from HMSO.

Teaseed Oil Imports.—The Ministry of Food announces that, in agreement with the Board of Trade, applications will be considered for the import of teaseed oil from Hongkong. The first quota of licences will be issued as soon as possible after May 22 and will be valid for six months. A further quota of licences will be considered at a date to be announced later.

Blaw-Knox Russian Contract.—Blaw-Knox, Ltd., is to supply Russia with 210 "Insley" $\frac{1}{2}$ cubic yard excavators with shovel attachments. A contract has been signed with the Russian Trade Delegation in accordance with the terms of the recent trade and payments agreement between the British and Soviet Governments.

Less Coal Produced.—Provisional figures for last week's coal production show that only 4,126,200 tons were obtained, as against 4,223,600 the week before. The Ministry of Fuel and Power attributes the fall in tonnage to holidays, disputes and other causes, and it affected both deep-mined and opencast coal.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

MONO-PLASTIC CHEMICALS, LTD., London, S.W. (M., 15/5/48.) April 6, £2000, £1000, £1000, £1000, £1000, £1000 and £1000 debts., parts of a series already registered.

NORTH EASTERN CHEMICALS, LTD., Newcastle-on-Tyne. (M., 15/5/48.) April 7, £10,000 mortgage to St. John's Malting Co., Ltd.; charged on premises known as North Eastern Paper Mills, Marsden (Durham). *— December 31, 1945.

S. G. BROWN, LTD., London, W., scientific instrument manufacturers. (M., 15/5/48.) March 30, £165,000 deb., to H.M. Treasury Solicitor; charged on property abutting Shakespeare Street, Acme Road, and Milton Street, Watford, known as Waterlow Works, and fixtures, fixed plant, etc., and a general charge. *Nil. February 6, 1947.

Satisfaction

GRANVILLE, WOOD & CO., LTD., Oldham, manufacturing chemists. (MS., 15/5/48.) Satisfaction April 9, of mortgage reg. December 2, 1947.

New Companies Registered

Escade, Ltd. (453,533).—Private company. Capital £100. Manufacturing chemists, chemical engineers, sterilisers, etc. Directors: Wm. A. Whitehead, L. G. Leach and R. Bamborough. Reg. office: 123/5 Clayton Street, Newcastle-on-Tyne.

Charles Read & Sons, Ltd. (453,476).—Private company. Capital £1000. Manufacturers of chemicals, gases, drugs, medicines, etc. Directors: R. E. Huggins and L. E. Colyer. Reg. office: 68 Kirkham Street, Plumstead, S.E.

Laporte Pension Fund Trustees, Ltd. (453,553).—Private company. Capital £100. To carry on the business indicated by the title. Directors: L. P. O'Brien, C. H. Burton, Wm. J. Piggott, J. Harnaman, B. E. A. Vigers and J. Jones. Reg. office: Kingsway, Luton.

Electron Directors, Ltd. (452,160).—Private company. Capital £100. Inventors, designers and manufacturers of electric meters, scientific and industrial instruments for laboratory and industrial use, etc. Directors: Wm. H. Storey and Mabel E. Storey. Sec.: W. H. Storey. Reg. office: 24 Dingwall Road, Croydon.

Tottenham Chemicals Ltd. (451,335).—Private company. Capital £2000. Manufacturers of soap, oils, greases, oleaginous and saponaceous substances, chemical products and preparations, etc. Directors: B. B. Berry, Margaret Berry, John H. Berry and G. G. Lennard. Reg. office: 249-251 West Green Road, N.15.

J. Floris, Ltd. (451,581).—Private company. Capital £25,000. To acquire the business of a manufacturing chemist and perfumer formerly carried on by Kenneth D. Marsh, at 89 Jermyn Street, S.W.1. Directors: K. D. Marsh, H. F. Burgess, P. J. Bodenham and M. C. Bodenham. Secretary: P. J. Bodenham. Reg. office: 89 Jermyn Street, S.W.1.

Company News

The nominal capital of **Pure Chemicals Ltd.**, 16 Bruton Place, London, W.1, has been increased beyond the registered capital of £1000 by £9000 in £1 ordinary shares.

The nominal capital of **International Laboratories, Ltd.**, 18 Old Town, Clapham S.W.4, has been increased beyond the registered capital of £10,000 by £30,000 in £1 ordinary shares.

Boots Pure Drug Co., Ltd., announces a final dividend of 20 per cent, making 40 per cent, less tax for the year ended March 31, 1948 (same). The group's net profit was £948,401 as against £1,037,509 last year.

Chemical and Allied Stocks and Shares

THERE has been a firmer trend in stock markets owing to the possibility of improved Russo-American relations. Business was slightly more active, assisted by a further rise in British Funds, and the general position of markets appeared to be steadier. In industrials, leading shares were favoured because of the assumption that profits and dividends should be maintained, bearing in mind the increased efforts in the export markets.

Imperial Chemical at 49s. 6d. have been steady, owing to the good impression created by the past year's trading results and Lord McGowan's annual statement. The latter

contains a hint that more capital may be required; but the market does not expect any early development in this connection. Fisons at 60s. 6d. have remained under the influence of the past year's figures under the other directions, Laporte Chemicals 5s. ordinary have risen to 22s. on the terms of the new capital issue, 1,010,400 new ordinary 5s. shares being offered to shareholders at 18s. 6d. each in the proportion of three for every five held. The company and one of its subsidiaries are extending their hydrogen peroxide and titanium oxide plants at Luton. In addition, an entirely new hydrogen peroxide plant is being constructed at Warrington.

Elsewhere, Monsanto Chemicals 5s. shares have been firm at 61s. 3d. British Glues & Chemicals 4s. ordinary strengthened to 22s. 9d., and British* Drug Houses 5s. ordinary were active at slightly over 12s. Glaxo Laboratories displayed firmness at £18, and there was a further rise to 28s. in Imperial Smelting. British Oxygen at 99s. 4½d. remained firm, but on the other hand, Turner & Newall have eased to 75s. 1½d., and Dunlop Rubber last a few pence at 73s. 9d. Amalgamated Metal firmed up to 22s. in anticipation of an early Government decision regarding the reopening of the London Metal Exchange. De La Rue improved to 46s. 3d., but British Industrial Plastics eased to 8s. 3d., and British Xylonite were £6½.

Iron and steels have remained quite well maintained, despite the continued fear that a Bill for nationalisation of the steel industry may be introduced towards the end of the year. It is recognised that yields are attractive and that current market prices are below break-up values and below a fair "pay-out" level in the event of nationalisation. United Steel were 30s., Dorman Long 32s., and Colvilles 31s. 10½d. Guest Keen were 50s. 7½d., and in response to the full results and the company's big order book, Babcock & Wilcox strengthened to 73s.

Units of the Distillers Co. eased to 28s. 1½d., and British Plaster Board receded to 25s. Associated Cement were 73s. 9d. In other directions, Pinchin Johnson were better at 55s. 3d. following the new issue terms, but International Paint receded to £8½. Elsewhere, United Molasses were good at 51s. 6d.

Boots Drug moved a few pence lower at 33s. 6d., Beechams deferred eased to 21s. 9d., Saugers were 35s., and Timothy Whites 40s. General Refractories were 24s. 3d., and Lever & Unilever at 51s. 3d. were slightly lower on balance. Oil shares responded to the better international news, although Anglo-Iranian at £8½ were uncertain await-

ing developments in Palestine. Trinidad Central shares strengthened to 23s. 6d. following the dividend. V.O.C. were better and shell steady at 78s. 9d. awaiting the dividend.

British Chemical Prices

Market Reports

ALMOST all sections of the market report a considerable flow of inquiry, with the supply position showing no pronounced improvement. The chief consuming industries are again calling for substantial deliveries under existing commitments, and in some instances producers are finding difficulty in meeting specifications in full. The overall demand for export is certainly not less in volume and, if anything, inquiries are more persistent and the continuation of these conditions will be helped by the B.I.F. While there have been no outstanding alterations, recently announced, reduction of 1½ per cent in I.C.I. prices will necessitate a slight adjustment in market quotations for a whole range of products, and this in spite of a very firm undertone which exists in nearly all sections of the industrial chemicals market. The trade in coal-tar products remains very steady and the position with regard to supplies is unchanged. A satisfactory export business has been maintained, with France, again the chief buyer of pitch.

MANCHESTER.—The past week has witnessed a good inquiry for a wide range of light and heavy chemical products on the Manchester market, with both home consumers and shippers displaying active buying interest. Prices in many directions have been reduced slightly in accordance with the recently announced policy of the leading manufacturers; otherwise the undertone remains steady. The demand for soda ash and other alkali products remains at a good level and the production of these and a number of other lines is being readily absorbed. In the fertiliser trade, superphosphates and a number of other materials are meeting with a brisk demand; steady pressure for supplies continues to be reported in the tar products market.

GLASGOW.—In the Scottish chemical market business has continued on a reduced scale during the week. There are still no signs of a return to the conditions which normally prevail at this time of the year and there has been no noteworthy demand for any particular chemical apart from sodium chlorate. In the export market, conditions have also been quiet, although some orders have been received. In general, the present position of business in chemicals gives no cause for satisfaction.

Patent Processes in Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted will be obtainable, as soon as printing arrangements permit, from the Patent Office, Southampton Buildings, London, W.C.2, at 1s. each. Higher priced photostat copies are generally available.

Complete Specifications Accepted

Process for producing unsaturated aliphatic compounds.—American Cyanamid Co. April 12, 1941. 600,653.

Control device.—Power Jets, Ltd., and D. N. Walker. March 20, 1942. 600,654.

Dyestuffs intermediates.—General Printing Ink Corporation. May 2, 1942. 600,703.

Production of compositions containing modified castor oil fatty acid radicles.—L. Berger & Sons, Ltd., D. H. Hewitt, and F. Armitage. March 31, 1944. 600,705.

Manufacture of water-soluble amide derivatives.—Soc. of Chemical Industry in Basle. April 8, 1943. 600,706.

Manufacture of amide derivatives.—Soc. of Chemical Industry in Basle. April 22, 1943. 600,707.

Stabilisation of acrylonitrile against deterioration.—American Cyanamid Co. Feb. 16, 1943. 600,708.

Internal-combustion turbine power plants.—Power Jets (Research & Development), Ltd., H. Constant, and W. R. Hawthorne. April 18, 1944. 600,608.

Production of penicillin. J. W. Foster, and L. E. McDaniel. May 15, 1943. 600,657.

Steel alloys and enamelled steel articles.—C. E. Every. (Titanium Alloy Manufacturing Co.) Aug. 28, 1944. 600,564.

Thermosetting resins.—Westinghouse Electric International Co. Oct. 25, 1941. 600,718.

Production of sodium-penicillin.—E. R. Squibb & Sons. Aug. 6, 1943. 600,719.

Preparation of salts of organic acids.—E. I. Du Pont de Nemours & Co., and C. H. Hamblet. Sept. 25, 1944. 600,721.

Preparation of salts of organic acids.—E. I. Du Pont de Nemours & Co., A. G. Weber, and C. H. Hamblet. Sept. 25, 1944. 600,722.

Powder metallurgy.—American Electro Metal Corporation. Oct. 30, 1943. 600,729.

Insecticidal composition.—R. Walsh. Oct. 15, 1943. 600,614.

Decomposition of sulphuric acid.—Chemical Construction Corporation. Dec. 11, 1943. 600,568.

Production, storing and distribution of acetylene.—C. H. Bingham. Jan. 9, 1945. 600,617.

Cation exchange resins and production thereof.—American Cyanamid Co. March 30, 1944. 600,569.

Manufacture of synthetic resinous condensation products.—Beck, Koller & Co. (England), Ltd., E. A. Bevan, and R. S. Robinson. Jan. 31, 1945. 600,618.

Diazo dyestuffs and pigments.—General Printing Ink Corporation. May 2, 1942. 600,739.

Production, storing, and distribution of acetylene.—C. H. Bingham. Feb. 9, 1945. 600,619.

Sulphonamides and process for preparing same.—General Printing Ink Corporation. March 11, 1944. 600,623.

Production of ethyl ether.—Les Usines de Melle. March 26, 1943. 600,757.

Glue extender and glue compositions containing the same.—Soc. of Chemical Industry in Basle. May 16, 1944. 600,758.

Production of compositions containing synthetic resins for use as cements, coatings, or the like.—W. Blackman, and J. E. S. Whitney. April 18, 1945. 600,763.

Processes of preparing interpolymers of vinyl aromatic compounds, and the products resulting therefrom.—A. H. Stevens. (Monanto Chemical Co.) April 20, 1945. 600,765.

Polycarboxylic amino acids.—H. W. K. Jennings. (Martin Dennis Co.) May 24, 1945. 600,629.

Corrosion protective compositions.—Shell Development Co. Aug. 11, 1943. 600,775.

Hydrogenation of organic compounds.—N.V. Internationale Hydrogeneerings- en trooien Maatschappij. (International Hydrogenation Patents Co.) April 18, 1944. 600,776.

Hydrogenation of organic compounds.—N.V. Internationale Hydrogeneerings- en trooien Maatschappij. (International Hydrogenation Patents Co.) April 18, 1944. 600,777.

Polymers and process of producing the same.—B. F. Goodrich Co. June 2, 1944. 600,782.

Fischer synthesis.—Standard Oil Development Co. Dec. 20, 1944. 600,586.

Process for the reaction of hydrogen halides with unsaturated compounds. June 21, 1944. 600,785.

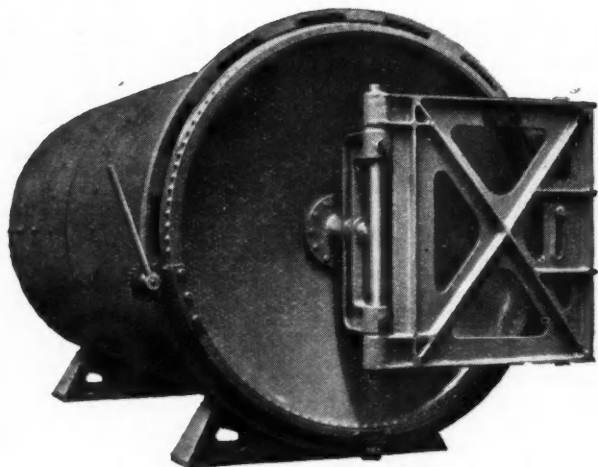
Manufacture of organic fertilisers with a sewage base.—A. E. Delroisse. March 5, 1941. 600,682.

Electrolytic production of aluminium.—Reynolds Metals Co. Jan. 30, 1945. 600,799.

Process for the manufacture of 5,4'-disubstituted diphenylamine carboxylic acids.—Ward, Blenkinsop & Co., Ltd., A. A. Goldberg, and W. Kelly. Oct. 10, 1945. 600,640.

Manufacture of imidazole compounds.—Ciba, Ltd. Dec. 21, 1945. 600,696.

Production of compositions containing synthetic resins for use as cements, coatings or the like.—W. Blackman, and J. E. S. Whitney. June 18, 1947. 600,800.



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SITUATIONS VACANT

None of the vacancies in these columns relates to a man between the ages of 18 and 50 inclusive, or a woman between the ages of 18 and 40 inclusive, unless he or she is exempted from the provisions of the Control of Engagement Order, or the vacancy is for employment exempted from the provisions of that order.

ASSISTANT Works Manager required for a non-ferrous metal works in London. Applicants should hold a degree in metallurgy, chemistry, physics or engineering, and should have some previous works experience. Age should not be over 35 years. Salary £750-£1,000 per annum according to qualifications and experience. Write Box 4637, FROST-SMITH ADVGS., 64, Finsbury Pavement, London, E.C.2.

CHEMICAL Engineers, or men with equivalent training, especially in physical chemistry, required for development and technical design of air separation and low temperature processes and for interesting work on new applications for oxygen. The work covers an increasingly wide range and prospects are good. The vacancies include one for a definitely senior man, with appropriate salary. Apply, giving age, qualifications, experience, and salary required to Box Q6876, A.K. Advgs., 212A, Shaftesbury Avenue, W.C.2.

ORGANIC CHEMIST or Chemical Engineer wanted for hydrogenation process at works near Manchester; initially for development including catalyst preparation, subsequently to take charge of plant. Previous experience in this branch is desirable. Write giving details of age, qualifications, experience and indication of salary required, to Box No. 2648, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4. This advertisement is published by permission of the Ministry of Labour and National Service under the Control of Engagement Order 1947.

SITUATIONS VACANT

HOPKIN & Williams, Ltd., require Chemists and Juniors for their St. Cross Street laboratories, E.C.1, for analytical and preparative work.

LARGE Company handling chemicals and raw materials require Sales Manager to handle sales London, Southern England. Must be experienced and with knowledge Paint and Rubber trades. Box No. 2662, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

PLANT Chemists urgently required for process plant operation by large company operating in the Middle East. Applicants need not be Graduates but should have had a chemical training up to Inter. B.Sc. or National Certificate Standard with experience of shift work in either a gas, coke oven or chemical works. Age not over 30. Salary according to qualifications and experience plus generous allowance in local currency, with free furnished bachelor accommodation, passages out and home, medical attention, also kit allowance and Provident Fund benefits. Apply stating age, qualifications and experience, etc., to DEPT. F.22, Box 1021, at 191, Gresham House, E.C.2.

THE British Oxygen Company Limited have some vacancies for Chemists in research work on gas separation problems. Candidates must be honours graduates with several years University or industrial research training, preferably in physical chemistry. A sound understanding of thermodynamics a great advantage. Applications, giving age, qualifications, experience and salary required, should be made to THE PERSONNEL OFFICER, The British Oxygen Co., Ltd., Grosvenor House, Park Lane, London, W.1.

THE Midland Tar Distillers, Ltd., Oldbury, Birmingham, invite applications for the following posts at their main tar distilling and oil refining works at Oldbury:

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- Three Gardner Horizontal Steam Jacketed **TROUGH MIXERS**, 5 ft. by 1 ft. 6 in. by 1 ft. 9 in. deep, glanded ribbon agitator, 3 in. diam. lever-operated bottom outlet, ½ in. steam connections to jacket.
- Two—Size 7 Duplex **MIXING and KNEEDING MACHINES** by Morton of Wislae. Steam Jacketed Trough, 42 in. by 38 in. by 30 in. fitted twin gunmetal blades, nabon type. Suitable for internal working pressure of 15 lb. per sq. in. or high vacuum. Forward or reversing pulley.
- Two—Horizontal Cast-iron Steam Jacketed Double-trough Fin-bladed **MIXERS** by Werner Pfeleiderer, 2 ft. diam. by 3 ft. 2 in. wide by 2 ft. 6 in. deep. Heavy glanded agitator shafts from fast and loose pulley, 26 in. diam. by 6 in. face.
- One—No. 3 Manesty Steam-heated Automatic **WATER STILL**, 20 gall. per hour capacity. Overall height, 7 ft. Complete with bracket for wall mounting.
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